

April, 1982

Single Copies \$2.50

the RAINBOW

5803 Timber Ridge Drive • Prospect, KY 40059

VOLUME I NUMBER 10

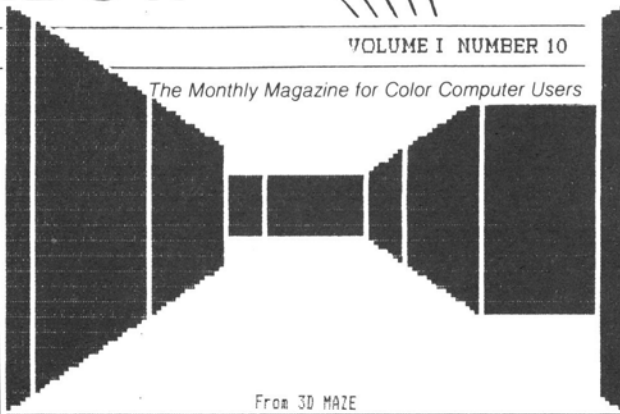
The Monthly Magazine for Color Computer Users

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Match Music Tones
On-Screen Scores

Word Processors Reviewed
Two GREAT Games
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Hints & Tips

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Editor's Notes...

PRINT #-2,

Well, no one came up with a *CANTERBURY ADVENTURE* for this, the April issue, as I suggested in my column a month ago. I didn't really expect it, though, on such short notice.

But, that does give rise to telling you that we are planning a special "Adventure" issue for the future -- probably in late summer. That issue will have a whole bunch of adventure information and a lot of reviews of adventure software. While we won't stint on other useful stuff, we plan to target a good portion of

that issue of the *RAINBOW* to adventures.

And we're planning some other special issues, too. General subjects are on home utilities like money management and the like, and on educational programs. This does not mean we'll be "saving up" for these issues, but we do plan to have an emphasis on those subject areas in the coming months.

You'll see a notice inside about

(Continued on Page 32)

LETTERS TO RAINBOW

MORE PRETTYPRINT

Editor:

I just received my first issue of the RAINBOW today. Good stuff!

I have some additional information regarding prettyprinting with CoCo. As you stated, a colon must be placed right after the line number when entering extra spaces to a new statement. However, once the line has been entered, extra spaces can be added without the colon key using the BASIC editor's insert command. A note of caution, these spaces will disappear if you save the program in ASCII format.

On a different note, I read with interest your Pipeline column concerning Wayne Green and 80-Micro. Bravo for our side! Wayne seems to think he is doing his readers a favor by publishing 80-Micro. Three cheers for everyone who supports the CoCo.

Ron Crouch
Ft. Worth, TX

INTO MUSIC COMPOSING

Editor:

I have received my second issue of the RAINBOW and the back issues I ordered. I really enjoy the magazine and think it is the best.

I'm hoping that someone will come up with a really good and complete music coposer program. Radio Shack's is a fine one as far as it goes, but it left out too many essentials to be used for any serious use.

I hope to become adept at programming and your magazine is a great help toward that goal. I look forward, each month, to receiving the RAINBOW.

Norman C. Place
Zolfo Springs, FL

MORE RANDOM THOUGHTS

Editor:

In your February issue, Mr. Hasenstaub wrote in about the RND function for dice simulation. He is correct in saying that two RND

functions are necessary in order to obtain "correct" odds for given numbers.

However, when he says that by using only one RND function you will get numbers between one and twelve he is only partially correct. You can very easily get RND numbers between two and twelve by applying a conditional statement to the RND variable you are using -- although the odds for all numbers will be the same.

The following short program will produce RND numbers between two and twelve using only one RND function.

```
10 CLS
20 FOR N=1 TO 24
30 A=RND(12)
40 IF A<1 THEN GOTO30
50 PRINT A,
60 NEXT N
70 END
```

Thank you.

Rita Lawry
Cleveland, OH

ART PRINTS?

Editor:

Can anyone out there help me? I bought a Radio Shack ART GALLERY CoCo program today and was surprised (and disappointed) to find that it does not have a way to output screen contents to the printer.

I am inexperienced in programming and don't know of a way to accomplish this. Is there maybe an easy program that would "load" a picture saved on cassette, and then print using the screen print program -- which I have. Or some other way?

Gary Burkhardt
Coldwater, MI

AGREES WITH REVIEW

Editor:

Congratulations on the success and growing popularity of your publication. The capability of the Color-80 for the price is outstanding and I am sure the market will continue to grow. The one need is for more dedicated software and technical support such as the kind you are providing.

I am in agreement with the review by Rick Smith in your February issue on the 32K upgrade from one of your advertisers, Computerware. It works perfectly. The installation went well following their suggestion that low profile sockets be installed between the motherboard and the new board to allow for any minor alignment. The OM ERROR is gone.

John Arbogast
Hamilton, OH

A MERGE SYSTEM

Editor:

I enjoyed your Pipeline comments of February. The RAINBOW and the CoCo are really growing. It is refreshing to find TRS-80 Color Computer ads without having to sort through all the others.

For some time I have been looking for a merge routine to join two rather long BASIC programs. Perhaps there is a merge routine, but I couldn't find one so, being the sort of person I am, I set out to build one (Ed. Note: The September issue, No. 3, carried a merge routine).

Here is how my manual merge routine works:

If your programs are very long, you may have to edit out unnecessary lines of each program in order to get them both into memory. Also, some memory may be "taken back" from CoCo. Check the highest line number of the first program and renumber the second so that its starting line number is higher.

Now, on a blank cassette tape, CSAVE each program with its name using the ASCII format. Make note of how many "data bursts" there are in each program. The first "data burst" contains the ID and program type information. The last "data burst" contains the end of file information.

Now, CLOAD the first program, counting the "data bursts" and stop the tape recorder just before the last one. Leave the computer as is, it is still open to receive data.

Unplug the ear plug from the recorder and cue up the second

CORRECTION:

Page 20 Column 1 Line 500

SHOULD: 500 N = 4; D = 5; A\$ =
GASOLINE; C = 159; GOSUB 440; RETURN

program just past the first "data burst." Plug the ear plug back into the earphone jack of the recorder.

Now, press PLAY on the recorder. CoCo will keep on receiving data as if it were never interrupted until it receives the end of file information from the second program.

I find it easier just to pull the earphone plug from the cassette player just before the last "data burst", let the tape play through the player's speaker, and shove it back into the earphone jack just after the first "data burst" of the second program. You have to do it fast to do it this way but you may have better luck with the process -- especially if your tape recorder has a slow startup speed.

James Richter
Corpus Christi, TX

VIDEOTEX ON CART

Editor:

Your magazine is to be complemented on the information which it provides for owners of the Color Computer.

I am interested in obtaining information on how one can either print or dump the screen while using the VIDEOTEX program. The program I have is not on tape, but on a ROM cartridge.

In closing, let me say that as a research scientist, I find the Color Computer to have great potential in the lab and that your magazine seems to contain the type of information -- in both articles and advertising -- that I need to make the best possible use of my computer.

Orest Gienbacki
Brooklyn, NY

WORD PROCESSOR IS SIMPLE

Editor:

When I received the January issue of the RAINBOW I immediately began using the word processing program you printed on page 11. Would you believe that was the first time I used my printer as a typewriter. Your program is so simple its unbelievable.

The RAINBOW has been extremely helpful to me and I anxiously await each issue.

I bought my CoCo in May, 1981, with 16K Extended Color Basic, and I have since modified it with a 16K Plus board from Computerware. I also have two disk drives and an Epson MX-80 printer. Since my initial investment, I am not sure I have made the best selection. Thus far, I have not been able to print graphics except from the short programs listed

in the MX-80 manual after I enter the Radio Shack PTFX16 program that changes the computer output from seven bit to eight bit. When I try to print other graphics, all I get is garbage. The same is true when I use the Radio Shack SCREEN PRINT program.

George Klement
Grandview, MO

(Ed. Note: The LP VII and LP VIII use dot/bit graphics which work with Radio Shack's SCREEN PRINT program. The MX-80 does not have dot/bit graphics unless you install the GRAFTRAX modification. Even then, the driver routines may be different so that you will have to write your own graphics programs. Does anyone have any further details on this?)

BORDER BEGONE?

Editor:

Your magazine was just what I was looking for for my CC.

Question: What commands can I give my 32K CC to not have the border around the screen so that the whole screen can be used?

Dennis DiJusto
Bronx, NY

E.N.G.L.I.S.H.

Editor:

Got my first edition of the RAINBOW today and am finally impressed by a computer mag. Like Tom Nee of Pittsburgh, I need experts to talk to me in ENGLISH (Easy Non-Gibberish Language Including Simple Homologues), a language even more basic than BASIC. Remember it?

When I bought a TV set I was told how to plug it in, turn it on and tune in to the channel I want to watch. When I bought an adding machine I was shown the buttons and functions. I was very satisfied.

I want an inexpensive word processor, perhaps with a built-in spelling checker. Why must I wade through chips, POKE, PEEK, compiler,

smart terminals, Etc., Ad Nauseum.

Your publication comes closest, but where can I go to get ENGLISH answers to my questions?

I am a writer looking for a tool with no desire to become a programmer, technician or -- God help us -- a system analyzer.

HELP (Honestly Easy Language/Please).

Glenn Knight
Glen Burney, MD

Editor:

Regarding the letter in February from Mr. Tom Nee, I am in complete agreement with him. I would like to take the issue one step further. We are not hardware (electronics) experts either!

I'm going to stick my neck out and venture a guess that at least two-thirds of the present total market for peripherals, upgrades and software for the Color Computer consists of novices and semi-technical types that have a genuine interest in the CoCo, and, those folks that always seem to have money to spend on new things. So, why not write straightforward, plain-talk ads (and articles for that matter) about your products?

Don't get me wrong, I'm not talking about taking the CoCo to the level of a toy -- heaven forbid!!! I am talking about communicating the practical utility and worth of your products which can expand, upgrade and support the Color Computer in a manner that the layman can understand. And, in a manner that will allow him to make a buying decision.

By the way, if I'm wrong about the available marketplace, I'll withdraw my neck and extend my wrist for a slap. Maybe the RAINBOW would consider running a survey.

Jim Rauh
Kennewick, WA

(Ed. Note: O.K. everyone. Let's hear from you.)

the RAINBOW
PUBLISHED BY FALSOFT, INC.
5803 Timber Ridge Drive
Prospect, KY 40059
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LAWRENCE C. FALK — Editor

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Limited back issues are available for \$2 each for issues 1-7, \$2.50 each for issues 8 and upward. Shipping and handling costs of \$2.50 per order must be added.

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The RAINBOW is published every month of the year.

the ASSEMBLY CORNER

(EDITOR'S NOTE: Assembly Language is one of the most complicated subjects faced by personal computer users. Yet, it is one which can offer some of the greatest programming rewards for the experienced. The RAINBOW asked Dennis Lewandowski of DSL Computer Products, an experienced assembly language programmer, to write a series of tutorials on the subject. Dennis' column will appear monthly in the RAINBOW and is aimed at the beginner. We hope you will enjoy this new feature.)

By Dennis Lewandowski

Hello. And welcome to a new series of articles on 6809 assembly language. Lonnie Falk (who!) has asked me if I would share my knowledge of assembly language with the RAINBOW's readers. In deciding where to start, I will assume you have never dabbled in assembly language before and we will begin, as they say, from scratch.

First of all, you will need to become familiar with the "language" used in assembly language and you should also know about the three numbering systems we will be using.

THREE numbering systems? Eeeh gaad! No, don't stop reading here,

one of them is decimal -- the same system you use every day and were taught in grade school. That's easy.

System two is the only set any computer in the world, including our favorite CoCo, uses. It is called binary. Binary is based on the number two and the only "legal" numbers in the system are one and zero. (That's two numbers.) Once you have one and add one to it, you get 10. Confusing at first, yes. However, binary can be converted into the third number system, hexadecimal or hex. This is the most commonly used by computer programmers and is the best compromise between the system you know (decimal) and the one your CoCo knows (binary).

Hex is based on the number 16. Hold on there! There are only 10 numbers, zero to nine. How do we get 16 of them.

Well, we won't make up any numbers to confuse you, we'll just steal a few symbols from someplace else. And that someplace is the alphabet.

So, our hex numbers will translate into decimal numbers like this:

HEX	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DEC	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

But, since hex is based on 16 and binary on two, once you achieve 16

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hex, or two binary, you have "10" -- which is one in the "next greater" column. In other words, the number systems recycle according to their base, 2, 10 or 16.

There are whole books explaining the differences in numbering systems, and I don't (and can't) condense them all here. So, if you're a little confused by this, perhaps you can check one out of the local library and delve into it a little more deeply.

Now, about the language difference. Its not all that different. But, you might not be familiar with some of the words yet. You've already become acquainted with two of them, *hex* and *binary*. Let's borrow the dictionary format for the rest -- although we'll group them by subject, not alphabetically.

BIT -- The smallest piece of information your CoCo uses. A bit may be *SET* to one (1) or *RESET* to zero (0).

NIBBLE -- Four bits in a row, easily converted to a hex number 0 if all are reset, to an F if all are set.

BYTE -- Eight bits, or two nibbles in a row. Also easily converted from binary to hex. If all

are reset, it is 00. If all are set, it is FF.

DATA -- The arrangement of bits within a byte.

REGISTER -- A one or two byte location in which data is stored or acted upon. Can have many different uses and definitions.

MEMORY -- A series of bytes used for data storage.

ROM -- Read Only Memory. Data which has been saved for continual use and which is not meant to be changed. It cannot be erased if power is disconnected.

RAM -- Random Access Memory. A series of bytes which can be changed and reused over and over again. It will always be erased when the power is turned off.

PROGRAM -- A series of bytes designed to instruct the computer to perform in a certain manner. Can be saved on ROM or placed in RAM from tape, disk or keyboard.

BASIC -- An acronym for Beginner's All-purpose Symbolic Instruction Code. It is a series of programs, usually in ROM. CoCo uses a BASIC interpreter which must analyze each instruction before carrying it out.

MACHINE LANGUAGE -- The actual set of codes the CoCo uses to perform any function. No analysis of the instructions takes place, and the computer will do exactly what it is told.

OP CODE -- Operational Code. A name given to a machine language code, usually abbreviated to two through four letters for easy use.

ASSEMBLER -- A program which takes the OP CODE, does an analysis of it, and writes a machine language program.

I/O -- Input/Output. A computer's way of interfacing with the outside world. The keyboard is an example of input; the video display an example of output.

Well, enough definitions for now. But, in addition to helping you understand some of the terms we will be using, the definitions are the key to why assembly language can be such a good way to program.

Remember, we said that machine language is the actual set of codes the CoCo uses and that an assembler takes op codes, does an analysis, and generates a machine language program? Well, because that machine language uses the CoCo's *own* code, the machine language program is faster, more detailed and takes up less space than does a BASIC program. A BASIC

(Continued on next page)

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ASSEMBLY (From Page 5)

program is interpreted each time it is run. An assembly language program is interpreted only once -- when it is created. You leave out a whole step.

I can see you can see the end of this opening column in sight and are asking, is that all I'm going to get out of this, numbers and lingo? No way.

We'll get into using all of this in subsequent columns, but we do want to be firmly grounded in the basics first.

Until then, and to whet your appetite to the power of assembly language programming, I have included a short BASIC program which will put a machine language program into the memory of your CoCo and call it using BASIC's USR function. Its in this form because many of you may not have an assembler yet. The program will demonstrate the power of machine language by changing all colors of graphic blocks to the next color by using a 30 byte subroutine while leaving the text on the screen alone. It is written for Extended Color Basic. For non-extended, add a line:

```
80 POKE 275,4:POKE276,0
```

For 32K, change 12288 to 28672 in line 70.

```
70 DEFUSR0=28672
90 DATA 142,4,0,166,128,140,6,0
100 DATA 39,20,129,129,37,245,12
9
110 DATA 241,44,8,139,16,167,130
120 DATA 166, 128,32,233,128,112
,32,246,57
130 FOR X=28672 TO 28702:READY:P
OKE X,Y:NEXT
140 CLS(0)
150 Y=255:Z=480
160 FOR X=1024 TO 1216 STEP 32
170 FOR A=0 TO 31:X1=X+A
180 POKE X1,Y:POKE X1+Z,Y
190 NEXT A:Y=Y-16:Z=Z-64:NEXT X
200 PRINT0230,"PRESS THE SPACE B
AR";
210 PRINT0262,"TO INCREASE SPEED
!";
220 X=1000
230 FOR Y=0 TO X:NEXT
240 A=USR(0)
250 IF INKEY$="" THEN 230
260 X=X/2:IF X<1 THEN X=1
270 GOTO230
```

Next month we'll look at the Central Processing Unit, the CPU.

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COMING SOON! --> C.C. Mailer

This is being written in February (with Disk C.C. Writer by the way) and April still looks like the ship date for this In Demand product. We mentioned that it was coming in our Product List and it was Back Ordered before it came out of Coding not to mention Systems and Field Testing. Mailing lists are a natural for the Color Computer and you add the ability to merge SELECTED Names and Addresses with your C.C. Writer Letters and you really have some Power. TransTek has some Fortune 500 Customers who recognize a Bargain too but the software listed above puts Real Systems in the reach of Individuals, Social Organizations, and Small Businesses (like us). Write for details.

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Game...

AN A-MAZING GAME FOR YOUR FUN!

By Scott L. Bain

Welcome to the world of three dimensional mazes.

The following program, **3D MAZE**, is designed to put you right in the action, searching through a labyrinth for a way out.

Type in the program and run it. It will display a message and have you wait a short time while it creates a maze. Every time you run **3D MAZE**, the maze will be re-drawn. It is never the same twice.

Next, you will have to choose between fast and slow screens. **3D MAZE** is written in BASIC, and while the paint command used for the slow screens makes a more attractive display, it also slows down the response time for moving from about one-half second to nearly three seconds. Since the score-timer is always running, it makes the game more difficult when the response is slow.

While it may not be as pretty, the fast screen has some advantages. First, the quick moves are nice.

And, second, with the fast screen you have another choice -- whether or not to use a "helper trail." The helper-trail causes the program to leave a trail of "crumbs" behind you. This is very helpful to keep you from exploring the same area twice and getting lost in a maze of little twisty passages, all alike.

Once the screen comes up, you will see a view of the corridor in the direction you are facing, or just a wall in front of you. If you are facing a wall, just keep turning until you're facing down a hallway.

Now, you can move freely through the maze. The up-arrow key will move you forward, the down-arrow will turn you completely around, and the right- and left-arrows will turn you in that direction. This will be an immediate turn, by the way.

You're looking for a hole in the floor. Once you find it, move into it and you will be out of the maze and the game will be over. The program will then switch to the text screen and display an overhead view of the maze, indicating areas you have explored and those you haven't. It will also tell you how long it took you to find the hole and where the hole was.

Occasionally you'll push a key,

(Continued on next page)

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MAZE (From Page 7)

hear the register beep, and it will seem nothing happened. Don't worry. This is because the new area you are looking at is just like the old one. One dead end looks like another. This is particularly a problem with the slow screen, so we've added a second, higher pitched, beep to tell you when your move is completed on the slow screen.

Also, the limit of your forward vision is four squares. Sometimes this will mean that the corridor you're looking down goes farther than you can see. The lesson here is that a dead end that is four squares away may not be a dead end.

The hole is always on the northernmost wall, somewhere. But, since you don't know which direction you're facing when you start, it could, effectively, be on any wall.

The system used here to generate the maze is called "frontier cell." If you're interested in learning more about it, let the RAINBOW know.

The listing:

```
2 '      3DMAZE      '
3 '      BY      '
4 '      SCOTT L. BAIN      '
5 '      '
6 '      P.O. BOX 178114      '
7 '      SAN DIEGO, CA      '
8 '      92117      '
9 '      -----      '
10 PMODE 0,1:PCLEAR4:PCLS:CLS
15 POKE65495,0
20 DIM M(11,11),F(50,2),V(5,2)
25 FORI=1TO10:SOUND110,1:NEXTI
30 PRINT@331,"\" /":PRINT@39
5,"/\" \":PRINT@364,"3DMAZE"
35 PRINT@0,"PLEASE WAIT 1 MINUTE
   WHILE I CREATE THE MAZE. ";
40 FR=0:X=5:Y=5:M(X,Y)=1:FORI=-1
TO1:FORJ=-1TO1:IFI<>0ANDJ<>0THEN
50ELSEIFI=0ANDJ=0THEN50
45 M(X+I,Y+J)=-1:FR=FR+1:F(FR,1)
=X+I:F(FR,2)=Y+J
50 NEXT J,I
```

```
55 CR=RND(FR):X=F(CR,1):Y=F(CR,2)
60 Z=0:FORI=-1TO1:FORJ=-1TO1:IFI
<>0ANDJ<>0THEN70
65 IFM(X+I,Y+J)=1THENZ=Z+1
70 NEXTJ,I
75 IFZ<2THEN95
80 M(X,Y)=-2
85 FOR I=CR TO FR
90 F(I,1)=F(I+1,1):F(I,2)=F(I+1,
2):NEXTI:FR=FR-1:GOTO110
95 M(X,Y)=1:FORI=-1TO1:FORJ=-1TO
1:IFI<>0ANDJ<>0THEN105
100 IFM(X+I,Y+J)=0ANDX+I>0ANDX+I
<11ANDY+J>0ANDY+J<11THEN M(X+I,Y
+J)=-1:FR=FR+1:F(FR,1)=X+I:F(FR,
2)=Y+J
105 NEXT J,I:PRINT".":GOTO85
110 IF FR<0THEN55
115 X=5:Y=5
120 D=RND(4)
125 TX=10:TY=RND(10):IF M(TX,TY)
<>1 OR TY=5 THEN 125
130 V(0,1)=0:V(0,2)=1:V(1,1)=1:V
(1,2)=0:V(2,1)=0:V(2,2)=-1:V(3,1)
=-1:V(3,2)=0:V(4,1)=0:V(4,2)=1:
V(5,1)=1:V(5,2)=0
135 CLS:PRINT"TURN THE SOUND UP.
":PRINT:PRINT"YOUR OBJECT IS TO
FIND THE HOLE IN THE FLOOR AND E
SCAPE.":PRINT
140 PRINT"USE THE ARROW KEYS TO
MOVE YOUR SELF FORWARD, OR
TURN RIGHTOR LEFT, OR TO TURN AR
OUND.":PRINT"USE THE 'C' KEY TO
CHANGE SCREENS.":PRINT
145 TIMER=0
150 PRINT"WOULD YOU LIKE:":PRINT
"1- EASY TIMER, SIMPLE SCREEN.":
PRINT"2- HARD TIMER, COMPLETE SC
REEN.":INPUT SP: IF SP<>1 AND SP
<>2 THEN CLS:GOTO 135
155 IF SP=2 THEN TL=0:PRINT"NO H
ELPER TRAIL POSSIBLE.":FORI=1TO1
50:NEXTI:GOTO 165
160 INPUT"DO YOU WANT A HELPER T
RAIL";A$:IF MID$(A$,1,1)="Y" THE
```

Peacock Ent.

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```

N TL=1 ELSE TL=0
165 IF PAGE=2 THEN PAGE=1 ELSE PAGE=
2
170 PMODE 0, PAGE
175 POKE 65495, 0
180 IF X=TX AND Y=TY THEN 440
185 RESTORE
190 PCLS:LINE(0,0)-(254,190),PSE
T:LINE(254,0)-(0,190),PSET
195 LINE(10,8)-(244,182),PSET,B:
IF M(X+V(D,1),Y+V(D,2))<.1 THEN C9
=1 ELSE C9=0
200 X1=X:Y1=Y:DR=D-1:DL=D+1
205 M(X,Y)=1.1
210 FOR I=1 TO 4
215 X1=X1+V(D,1):Y1=Y1+V(D,2)
220 READ E1,F1,E2,F2,B1,B2,B3,B4
,B5,B6,B7,B8,D1,D2,D3,D4,D5,D6,D
7,DB,CY,CR
225 LINE(E1,F1)-(E2,F2),PSET,B
230 IF X1=TX AND Y1=TY THEN CIRC
LE(126,CY),CR,,.5
235 IF M(X1,Y1)=1.1 AND TL=1 THE
N PSET(126,CY,5)
240 IF M(X1+(V(DL,1)),Y1+(V(DL,2
)))<.1 THEN 255
245 IF SP=2 THEN LINE(B1,B2)-(B3
,B4),PRESET,B
250 LINE(D1,D2)-(D3,D4),PSET,B
255 IF M(X1+(V(DR,1)),Y1+(V(DR,2
)))<.1 THEN 270
260 IF SP=2 THEN LINE(B5,B6)-(B
7,B8),PRESET,B

```

```

265 LINE(D5,D6)-(D7,D8),PSET,B
270 O1=X1+(V(D,1)):O2=Y1+(V(D,2)
)
275 IF O1<1 OR O1>10 OR O2<1 OR
O2>10 THEN 290
280 IF M(O1,O2)<1 THEN 290
285 NEXT I
290 IF SP=2 THEN LINE(128,8)-(128
,96),PRESET,B:LINE(128,98)-(236,
188),PRESET:LINE(126,98)-(22,180
),PRESET:PAINT(128,5),5,5
295 IF C9=1 THEN LINE(12,6)-(242
,184),PRESET,BF:GOTO 305
300 LINE(E1+2,F1-2)-(E2-2,F2+2),
PRESET,BF
305 SCREEN 1,1
310 POKE 65494,0
315 IF SP=2 THEN SOUND 200,2
320 A$=INKEY$
325 IF A$<>"^" THEN 345
330 IF M(X+V(D,1),Y+V(D,2))<.1 TH
EN 345
335 X=X+V(D,1):Y=Y+V(D,2)
340 SOUND 100,3:GOTO 165
345 IF A$<>CHR$(8) THEN 365
350 SOUND 100,3
355 D=D+1:IF D>4 THEN D=1
360 GOTO 165
365 IF A$<>CHR$(9) THEN 385
370 SOUND 100,3
375 D=D-1:IF D<1 THEN D=4
380 GOTO 165

```

(Continued on next page)

COLOR COMPUTER DISK SYSTEM

A complete disk drive system for the color computer, featuring the Tall Grass Technology Double density, buffered disk controller. This system will support up to 4 5 1/4 in. disk drives with a maximum capacity of 3.2 Mega bytes of storage using double sided 80 track drives. This is a minimum of 4 times the capacity of the "Standard" color computer disk drive system.

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MAZE (From Page 9)

```

385 IF A$="C" THEN SOUND200,2:CL
S:GOTO 150
390 IF A$<>CHR$(10) THEN 320
395 SOUND 100,3
400 D=D-2:IF D<1 THEN D=D+4
405 GOTO 165
410 GOTO 320
415 CLS:POKE65495,0:GOTO50
420 DATA 58,146,196,44,26,16,28,
174,224,20,220,170,10,44,58,146,
244,44,196,146,166,16
425 DATA 90,122,164,68,74,54,78,
136,176,56,172,134,58,68,90,122,
164,68,196,122,134,12
430 DATA 106,110,148,80,102,74,1
04,116,152,74,150,116,90,80,106,
110,148,80,164,110,116,8
435 DATA 114,104,140,86,110,82,1
12,108,144,82,142,108,106,86,114
,104,140,86,148,104,107,6
440 CLS:PRINT "ESCAPE! TIME=";T
IMER:PRINT:PRINT
445 FOR I=10 TO 1 STEP -1:FOR I1
=1 TO 10
450 IF I=TX AND I1=TY THEN PRINT
"O"; ELSE IF M(I,I1)=1 THEN PRI
NT "X"; ELSE IF M(I,I1)=1.1 THEN
PRINT "*"; ELSE PRINT " ";
455 NEXT I1:PRINT: NEXT I
460 PRINT@209,"X= UNEXPLORED":PR
INT@241,"*= EXPLORED":PRINT@273,
"O= ESCAPE":PRINT@448,"";
465 INPUT"ANOTHER MAZE":A$:IF MI
D$(A$,1,1)="Y" THEN RUN
470 POKE65494,0
475 END

```

Followup...

WHAT...MORE POLYGON?

We honestly know of no single program that has generated as much interest as R. Foulke's *POLYGON*.

In the continuing saga of this program comes this little gem from Roland Wong of West Covina, Calif., who adds an enhancement which will show the value of the variable M in the upper left-hand corner of the screen so you can note it down and use it to print out the particular pattern the program generates.

Here's the listing:

```

1 'POLYGON FOLLOWUP
2 'BY R. FOULKE - MODIFIED BY R.
C. WONG
5 PMODE 4,1:PCLS:SCREEN1,1
10 M=RND(90)
20 X$=STR$(M)
40 B$=RIGHT$(X$,1)
50 A$=MID$(X$,2,1)
60 IF M<10 THEN A$="0"

```

(Continued on Page 12)

**
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Blank tape-C10 cassette tapes w/leader .75 each 10 for \$6.00

POLYGON (From Page 10)

```

70 GOSUB1000
75 DRAW "SBBM3,15"+N$(VAL(A$))+N
$(VAL(B$))
90 PI=3.14159
100 FOR T=0 TO 2*PI STEP PI/75
110 R=COS(M*T)*95
120 X1=COS(T)*R+128:Y1=SIN(T)*R+
96
130 A=T+PI/3
140 R2=COS(M*A)*95
150 X2=COS(A)*R2+128:Y2=SIN(A)*R
2+96
160 LINE (X1,Y1)-(X2,Y2),PSET
170 NEXT T
180 FOR T=1 TO 500:NEXT
190 GOTO2
1000 N$(1)="BR4NU4BR"
1010 N$(2)="BR2U2R3U2NL3BD4NL3"
1020 N$(3)="BR2R3U2NL2U2NL3BD4"
1030 N$(4)="BR2BU2NU2R3U2D4"
1040 N$(5)="BR2R3U2L3U2R3BD4"
1050 N$(6)="BR2U4NR3D2R3D2NL3"
1060 N$(7)="BR2BU3UR3D4"
1070 N$(8)="BR2U4R3D2NL3D2NL3"
1080 N$(9)="BR2BU2NR3U2R3D4"
1090 N$(10)="BR2U4R3D4NL3"
1100 RETURN

```

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Back copies of ALL issues of the RAINBOW will soon be available.

All back issues sell for the single issue cover price -- which is \$2 for copies of numbers 1-8 and \$2.50 for copies of numbers greater than 8. In addition, there is a \$2.50 per order charge for postage and handling. This charge applies whether you order one back issue or all of them.

For ease of reference, issues 1-5 are stapled together as one packet, all on white paper. These are a special reprint. Issues 6 and 7, which have been out of stock for some time, are available as a single issue, also on white paper in a reprint form. However, we will break the packets and ship whichever ones you wish. All back issues now available would be \$18.50, plus \$2.50 postage and handling -- a total of \$21. VISA and MasterCard accepted.

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-- Available June 1, 1982 --

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MOTION PICTURE PROGRAMMING--THE DETAILS

By Arnold Pouch

In last month's issue of the RAINBOW, you read about what a powerful tool Motion Picture Programming (MPP) can be for CoCo programmers who are still using commands like DRAW, PSET, COLOR, LINE and PAINT to create graphics. MPP is a method of producing superior graphic programs packed with action that does not necessitate long hours with BASIC's graphic commands.

Superior Graphics Software offers these programming tools to CoCo users. Our CoCo is a special and powerful computer and has vast amounts of untapped capabilities. MPP is one of them, and it eliminates the need to produce what I call Big Ugly Graphis Moving Everywhichway to show motion.

All I ask in return is that you never again produce graphics with B.U.G.M.E.'s. Mark your programs with MPP so we will all know who spent the time and artistic effort to create them this easy, better, way.

Here are all the necessary tools you need to produce MPP. This tutorial is presented in three sections:

- I. Conversion Instructions
- II. Diagram
- III. MPP Course

CONVERSION INSTRUCTIONS

These instructions are based on Chromasette's excellent DRAWER program (August, 1981). We show here how to convert DRAWER to MPP DRAWER.

For 16K Extended Color Basic, make the following changes:

```
10 Change CLEAR10 to CLEAR20
14 Remove PCLS
16 Remove FOR...NEXT
20 Insert after A$=INKEY$:
IF A$="<" THEN250 ELSE IF A$=">"
THEN280 ELSE
228 Delete PRINT"TAPE":PRINT"
SAVE OR LOAD":
Insert: PRINT "MPP TAPE
INPUT/OUTPUT":PRINT" INPUT =<":
PRINT " OUTPUT = >":
```

Add the following lines:

```
250 CLS:PRINT:PRINT"TO LOAD MPP
PICTURE TAPES":PRINT:PRINT"READY YOUR
MPP TAPE IN CASSETTE":PRINT:INPUT
"PRESS <ENTER> WHEN READY";ZZ
```

```
252 SCREEN1,SC:CLOADM:GOTO200
```

```
280 CLS:PRINT:PRINT"TO SAVE MPP
PICTURES TO TAPE":PRINT:PRINT"READY
YOUR CASSETTE WITH FRESH TAPE AND
PRESS RECORD AND PLAY. DON'T FORGET
TO CHECK THE VOLUME"
```

```
282 PRINT:INPUT"HOW MANY GRAPHICS
PAGES?
4-PAGES
5-PAGES
6-PAGES";ZZ
```

```
284 PRINT:INPUT"TYPE NAME OF MPP
PICTURE ";ZZ$
```

```
286 CLS:PRINT0236,"STANDBY"
```

```
288 CSAVEM ZZ$,1536,1536+(1536*ZZ)-1,
44553
```

```
290 SCREEN1,SC:GOTO200
```

Also, delete lines 156-168 and 170-178.

For 32K, make these additional changes:

```
10 change PCLEAR6 to PCLEAR8 and
remove CLEAR20
```

```
12 Change MP=6 TO MP=8
```

(Continued on next page)

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226 Change both occurrences of "1-6" to "1-8"
 282 Change and add: 6-PAGES?
 7-PAGES?
 8-PAGES";ZZ

MPP COURSE

First of all, it is essential that you familiarize yourself with the full instructions which accompany Chromasette's *DRAWER* program. If you forget them, use the "H" for HELP command. It will not only give you a rundown of the commands, but will also tell you what the last command you gave was and show the exact X-Y coordinate of the cursor.

To help simplify these instructions, we will assume you will use PMODE 3,1 on a four-page MPP picture with two extra pages of Motion Modifiers (MM's). Your 4+2 pages will reside in memory locations 1536 through 10751 (PCLEAR 6). All references to higher memory addresses for 32K Extended Basic (and for Disk) will be omitted.

Now, take a look at the diagram. It is laid out in three sections: An MPP memory map is in the center; the three steps necessary to create MPP are on the left; and the Input/Output routines which will allow you to start and stop MPP drawing are on the right.

Connecting lines between the flowcharts and the memory map have been removed for the sake of clarity. Instead, we show the exact memory addresses for the START and END above each I/O box.

Now, to MPP...

STEP 1 - DRAW...

1. Place the converted *DRAWER* in your recorder, type PCLEAR6, and CLOAD it. RUN the program after it loads.

2. You will see blank memory pages 1-4. It's a mess. Press the <K> clear key to clear the screen. Now press the <P> page key and press 3. You have

switched the screen to pages 3 through 6. Pages 5 and 6 are still a mess, so press the K key again. Now that you have cleaned up the pages, press P and 1 to go back to pages 1-4.

3. Well, don't just sit there -- DRAW! Use the arrow keys, since the joysticks are difficult to control.

4. I don't see anything! Do something. Why don't you try a round clock face? Ah. That's better.

5. Let's draw the Motion Modifiers (MM's) now. These are simply repetitive drawings of a certain section of your picture where you want action to take place. These drawings are each a little different from the previous one and show a "time/motion" relationship -- such as 10 pictures of a clock hand moving from 15 minutes past the hour to 25 past the hour. MM #1 shows the clock hand at 16 after, MM #2 at 17 past, and so on up to MM #10 at 25 past.

6. Sounds like a lot of tedious work, right? It is, but your converted *DRAWER* program will do most of it for you automatically. We don't want the MM's to be visible, so press P and 3. Now press <I> image copy and follow the menued instructions to copy and move as many MM's as you think you will need for a smooth animation. When you <P>ut your MM's on pages 5 through 6, set them in neat rows so you can later program to GET them with just one GET command in a FOR...NEXT loop.

7. With the Image copy, you now have 10 pictures of a section of a clock showing 15 minutes after the hour. Put that cursor to work now -- and change each picture to the correct time. If your picture is complex, you can use as many MM's as you like to fill all of pages 5 and 6.

8. Getting tired? Just one thing before we can stop. Use the <H> help command and your cursor to find the X-Y coordinate for all your GET MM's and their X-Y PUT coordinates in your

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master MPP picture. Write them down neatly as follows:

```
MM NAME GET (X,Y)-(X,Y) P number (PMODE)
MPP NAME PUT (X,Y)-(X,Y) P number (PMODE)
  N   N   N   N   N   N   N   N   N   N
```

9. We can stop the processes for Step I at any time by pressing the ">" key and following the menu instructions. This procedure will automatically make an MPP picture tape.

10. Test yourself now to feel secure before you shut off the computer. Press "<" and follow the menu instructions to load your MPP picture tape back into the CoCo. Want to be sure its doing this? Draw a line through your picture and then load the tape in. You'll see the line disappear.

STEP II - PROGRAM

1. You must have produced an MPP tape in Step I before you can use Step II. This process will mess up your original picture as it GETs and PUTs your MM's. You may want to reload a clean picture several times during the process and you must have a clean picture in Step III to produce your final tape.

2. Before you start programming, you may wish to add these little utilities to the CoCo's memory:

```
9998 GOTO 9999 (This will hold the program on the screen)
9999 END
10000 PCLEAR6:PMODE3,1:SCREEN1,0:CLOADM (You RUN10000 and it
will visibly load your MPP picture tape whenever you
want a fresh picture)
10001 GOTO10000
20000 PMODE3,1:SCREEN1,0:GOTO20000 (You RUN20000 and your
picture will be displayed any time)
30000 PMODE3,7:SCREEN1,0:GOTO30000 (You RUN30000 and your
MM's will be displayed at any time)
```

3. Begin all your MPP BASIC programs with the following lines:

```
1 ' MPP BY (YOUR NAME)
2 ' SPRING, 1981
3 '
4 ' POKE27,XXX:POKE28,XXX:POKE29,XXX:
POKE30,XXX:POKE31,XXX:POKE32,XXX
5 PMODE 3,1:SCREEN 1,0
```

This will allow you to RUN from the start of the program and see your MPP picture again while you are programming and debugging. Your program starts at line 6.

4. Use normal BASIC and normal techniques. But what a blessing! No more long DRAW strings to fumble with and try to set blindly. No more figuring where SETs and RESETs should

go. No more COLOR, PCLS, or program-slowing PAINTs. Your graphic work was all completed in Step I. Your program only needs GETs and PUTs and you already have them written down with their addresses.

5. Here are some helpful hints in the programming:

A. Try DIMensioning only one array for all GETs and PUTs, using the same one over and over again.

B. Write all GETs and PUTs inside FOR...NEXT loops to step off the motion.

C. Write the MM's to maximum speed and slow them down later with time delay loops, PLAY commands and, even, GET/PUT loops inside GET/PUT loops.

D. Make your GETs and PUTs as small as possible to get the job done.

E. If you PUT garbage, remember GET and PUT must be the same exact size. The array doesn't matter as long as it is big enough for the largest GET/PUT.

F. DIMension your arrays big enough while programming and then EDIT them down to size when you're finished.

G. Keep your PMODE page
(Continued Next Page)

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MPP (From Page 15)

starts set correctly. Changing them will not affect your picture, only SCREEN can do that.

6. If your programming is finished, or you just want to take a break for a day, you can CSAVE "MPPBASIC" any time you wish to stop. You will now have two tapes saved, your picture tape and your basic tape.

7. You can restart at any time from this point by reloading the two tapes. For the picture tape, type in PCLEAR6:CLOADM and for the program tape just CLOAD.

STEP III -- COMBINE

1. When your picture tape and your program tape are completed to your satisfaction, load them both into memory (as in the paragraph above) but **DO NOT RUN OR EXEC THE PROGRAM!**

2. Now, your pictures reside in memory in locations 1536 through 10751 and your program is located in memory starting at 10752 (because we PCLEARed 6 before it was loaded). We do not know where the end of the Basic program is located, and this is what we have to find out.

3. Follow these steps carefully:

Type ?PEEK(27)	the answer will be your A value
Type ?PEEK(28)	the answer will be your B value
Type ?HEX\$(A)	the answer will be your A\$ value
Type ?HEX\$(B)	the answer will be your B\$ value
Type ?\$HA\$B\$	the answer will be your AB value

4. You now have everything you need to finish your MPP. Go to Line 4 in your Basic program, where you put in the X's after the POKES, and substitute the values you just found to make the line operational:

```
4          POKE27,A:POKE28,B:POKE29,A:
POKE30,B:POKE 31,A:POKE32,B
```

5. Place a fresh tape in your recorder, set it to play and record, and type in CSAVEM "MPPNAME", 1536,AB,44661. Then press <ENTER> and you will make a complete MPP tape.

Once you have made a copy, as in Number 5 above, turn your CoCo off, let it sit for about 15-30 seconds and turn it back on. Place the newly made tape in the recorder, press PLAY and type in PCLEAR6:CLOADM:EXEC. The tape will load and the program will auto-start with your MPP graphics in motion!

Next month, we'll list out an MPP program to show you how one type of graphic can be done.

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PIPELINE

PIPELINE

Probably the most successful single BBS in the CoCo world is the Connection-80 of Woodhaven, N.Y., operated by Bob Rosen. The BBS' first anniversary was on March 23 and Bob reports that more than 15,000 calls have come in to his system. Remember, Connection-80 is free and can be reached at (212) 441-3755 via terminal. Bob, who is the System Operator, can be contacted in person at (212) 441-2887. Connection-80 has been a real service to CoCo users and we salute Bob and his service.

We feel constrained to point out that the SAUNLET reviewed in last month's issue is a 4K program. Author Britt Monk mentions this to us by way of saying he believes we should not have been so unkind to his graphics in the review. We certainly see his point and pass it along to you. And, for the record, SAUNLET is one of the few machine language programs available for the 4K CoCo.

Does anyone really think the CoCo is soon headed for oblivion? Guess not and, for sure, here's some new proof from Tandy. In a thick batch of news releases -- complete with photographs -- Tandy is announcing a whole stable of educational software expressly written for CoCo. Among the most important: An agreement with Harper & Row publishers (a big time outfit) calling for HAR to develop and market educational courseware for schools. Judging by the large number of CoCo-related products, including a series of packages in cooperation with Children's Television Workshop (the people who brought you Sesame Street, The Electric Company and others), we'd say CoCo is only starting to make its impact felt in the market!

Speaking of big-time news on CoCo, we hear a report that Walter Cronkite's UNIVERSE program will feature graphics by CoCo next fall. This, we understand, isn't a one-time shot -- but a continuing exposure of our favorite computer throughout the year-long series on CBS.

We were asked the other day whether it would be possible to save a BASIC program with CSAVEN and then load it back in and have it be a machine language program. The answer is simply, "no." Through use of a program called a compiler, however, you are able to convert BASIC into machine language. We did a little checking around and hear that there are at least a couple of firms "working on" a compiler for CoCo. We'll keep you abreast of developments.

Nelson Software is shipping its SUPER COLOR WRITER program and says that an updated version, called SUPER COLOR WRITER II will be available by the first of April. Daniel Nelson says it's a "guarantee" that SCW II will be introduced on that date.

Armadillo Software says it has a FORTH program available on tape or disk. Two exceptional things about their announcement. First, they'll send tape and disk version for the same price ("so if you don't have a disk yet, you'll be all set when you get one"). Second, Armadillo will customize its program for any disk system you're using.

And, speaking of "other" disk systems, Cer-Comp is marketing a full function disk operating system for the TallGrass Technology disk controller. There are three systems in one package: A free-standing disk

system for use without the BASIC ROM system; a fully supported external system that interfaces with assemblers, editors and other types of programs; and a system which interfaces with Basic and Extended Basic. The system will work even with a 4K machine and uses only a little over 1K. Watch for a review.

Missing your monthly dose of fantasy-role playing game aids? Author John Urban hooked up on the losing side of the U.S. Postal Service this month. The series will continue next month.

The first computerized encyclopedia? Its available from Moses Engineering and comes on 48 cassette tapes. We know Roger Olsen will be pleased to note that the first item is reported to be "aardvark."

Radio Shack is now marketing a voltage spike regulator through all its retail stores under the familiar Archer brand.

UPDATE: Last month we asked whether anyone had received any software from Seebree's Computing. At press time, one reader wrote in to say he had.

By the by, we suggest you be sure to read advertisements carefully before you order. Most all will say what version of CoCo they are written for, and you should be sure they will run on yours. As always, the dishonest few make trouble for the rest of us ... but since it is easy to copy programs, it is understandable why software houses won't usually refund money to people who want to return programs because they might not be "what I expected."

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Home Finance...

COLOR BILLBARS HELP CHART SPENDING

By Mark S. Mosty

This program will allow you to produce graphic displays of amounts spent in various budget categories. It should be very helpful in comparing expenses from month to month.

I became interested in writing *COLOR BILLBARS* through general dissatisfaction with other home finance programs which failed to provide the user with comparative graphics or hard copy.

I use the program each month when I have finished balancing my checkbook and setting up next month's budget. The program is written in Color Basic and will, of course, run under Extended Color Basic as well. It requires 16K and uses about 5200 bytes of memory. I use a Line Printer VII and the printer routines are coded accordingly.

To adapt this program to your use, make the following changes:

1. Account names are located in lines 230-270 and 470-510.

2. Change the divisors to suit your needs by adjusting the "D" values in lines 470-510, using the following formula:

-- Take the highest value in the desired range (example, 500)

-- Divide by 25 (500/25=20) and use this value for your divisor.

3. Change the Scale Values in lines 440-450 to suit the range you have selected.

4. Make any necessary changes in the printer routine in lines 1360-1590.

COLOR BILLBARS can be adapted for a variety of uses, such as incorporation into a checkbook balancing program to provide graphic display of key accounts or to display virtually any numerical information.

The listing:

```
10 '
20 ' COLOR BILLBARS
30 '
40 ' BY MARK S. MOSTY
50 ' 714 LEE ST.
60 ' KERRVILLE, TEXAS 78028
70 '
80 ' PRINT FORMATTED FOR LPVII
90 '
100 DIM A(5,12)
110 ' INPUT NEW YEAR
120 CLS:PRINT@99,"IS THIS A NEW
YEAR? (Y/N)"
```

```
130 GOSUB 170
140 IFZ$="Y" THEN 180
150 IFZ$="N" THEN GOSUB 190:GOTO 290
160 GOTO 120
170 Z$=INKEY$:IFZ$<>" " THEN RETURN
ELSE 170
180 CLS:PRINT@99,"TYPE NEW YEAR.
";:INPUTY:GOS
UB190:GOTO 290
190 ' MAIN MENU
200 CA=255:CB=207:CC=191:CD=159:
CE=239
210 CLS(6)
220 PRINT@72,"WHICH ACCOUNT...?"
;
230 PRINT@104," 1. LCRA/LSG
";
240 PRINT@136," 2. PHONE CO.
";
250 PRINT@168," 3. FOOD
";
260 PRINT@200," 4. GASOLINE
";
270 PRINT@232," 5. UTILITIES
";
280 RETURN
290 PRINT@264,"OR...
";
300 PRINT@296," 6. READ TAPE
";
310 PRINT@328," 7. SAVE TO TAPE
";
```

(Continued on next page)

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BILLBARS (From Page 19)

```

320 PRINT@422," SELECT KEY AND P
RESS " ;:PRINT@462,"(1-7)";
330 PRINT@118,CHR$(CA);:PRINT@15
0,CHR$(CB);:PRINT@182,CHR$(CC);:
PRINT@214,CHR$(CD);:PRINT@246,CH
R$(CE);
340 GOSUB170
350 IFZ$="1" THEN GOSUB470:GOSUB5
20:GOTO1010
360 IFZ$="2" THEN GOSUB480:GOSUB5
20:GOTO1010
370 IFZ$="3" THEN GOSUB490:GOSUB5
20:GOTO1010
380 IFZ$="4" THEN GOSUB500:GOSUB5
20:GOTO1010
390 IFZ$="5" THEN GOSUB510:GOSUB5
20:GOTO1010
400 IFZ$="6" THEN1610
410 IFZ$="7" THEN1690
420 GOTO340
430 ' SCALES ADJUSTED HERE
440 SA=25:SB=50:SC=75:SD=100:SE=
125:RETURN
450 SA=100:SB=200:SC=300:SD=400:
SE=500:RETURN
460 ' DIVISORS (D) AND ACCOUNTS
ADJUSTED HERE AND AT 230-270
470 N=1:D=5:A$="LCRA/LSG":C=255:
GOSUB440:RETURN
480 N=2:D=5:A$="PHONE CO.":C=207
:GOSUB440:RETURN
490 N=3:D=20:A$="FOOD":C=191:GOS
UB450:RETURN
0 N=4:D=5:A$="GASOLINE":C=159:
GOSUB440:RETURN
510 N=5:D=5:A$="UTILITIES":C=239
:GOSUB440:RETURN
520 ' INPUT UPDATE
530 CLS:PRINT@99," DO YOU WANT T
O UPDATE THIS ACCOUNT? (Y
/N)":PRINT
540 GOSUB170
550 IFZ$="Y" THEN750
560 IFZ$="N" THEN580
570 GOTO 540
580 CLS:PRINT@99,"DO YOU WISH TO
REVIEW THE ENTRIES? (Y/N
)":
590 GOSUB170
600 IFZ$="Y" THEN 640
610 IFZ$="N" THEN GOSUB190:GOTO29
0
620 GOTO 590
630 ' REVIEW ROUTINE
640 GOSUB 210
650 PRINT@88," ";:PRINT@264,"
";:PRINT@296," DO
YOU WISH ";:PRINT@328," TO
REVIEW...? ";:PRINT@422," SELE
CT KEY AND PRESS ";:PRINT@462,"(
1-5)";
660 GOSUB 170

```

```

670 IFZ$="1" THEN GOSUB470:GOTO10
10
680 IFZ$="2" THEN GOSUB480:GOTO10
10
690 IFZ$="3" THEN GOSUB490:GOTO10
10
700 IFZ$="4" THEN GOSUB500:GOTO10
10
710 IFZ$="5" THEN GOSUB510:GOTO10
10
720 GOTO660
730 ' UPDATE ROUTINE
740 SOUND 150,4:PRINT" INCORR
ECT RESPONSE..." :PRINT:RETURN
750 PRINT" UPDATE: "A$:PRINT:
PRINT" ROUND OFF DOLLAR AMOUN
TS..." :PRINT
760 INPUT" WHICH MONTH (1-12)
";M:PRINT:IF M>12 OR M=VAL("") T
HEN GOSUB 740 ELSE 780
770 GOTO 760
780 INPUT" WHAT AMOUNT : $";M
(T):PRINT
790 IF N=3 AND M(T)>500 THEN GOS
UB 880
800 IF N<>3 AND M(T)>125 THEN GO
SUB 880
810 A(N,M)=M(T)/D
820 PRINT" ANOTHER MONTH? (Y/
N) ";:PRINT

```

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```

830 Z$=INKEY$:IFZ$="" THEN830
840 IFZ$="Y" THEN 760
850 IFZ$="N" THEN RETURN
860 GOTO 830
870 ' OVERLOAD ROUTINE
880 CLS:SOUND 150,4:PRINT@99,"AM
OUNT TOO LARGE...YOU'LL HA
VE TO ADJUST THE SCALES":PRINT@1
98,"(SEE LINES 440-450)":PRINT@
259,"PRESS 'ENTER' TO CONTINUE";
:INPUT E$:GOSUB190:GOTO290
890 ' SCREEN SUBROUTINES
900 CLS0:PRINT@7,A$;:PRINT@22,Y;
:RETURN
910 PRINTCHR$(128);STRING$(A(N,M
),C);:RETURN
920 X$=""
930 PRINT@32,M$;:GOSUB910:PRINT@
64,X$;:RETURN
940 PRINT@96,M$;:GOSUB910:PRINT@
128,X$;:RETURN
950 PRINT@160,M$;:GOSUB910:PRINT
@192,X$;:RETURN
960 PRINT@224,M$;:GOSUB910:PRINT
@256,X$;:RETURN
970 PRINT@288,M$;:GOSUB910:PRINT
@320,X$;:RETURN
980 PRINT@352,M$;:GOSUB910:RETUR
N
990 PRINT@387," 0":PRINT@391,SA:
PRINT@396,SB:PRINT@401,SC:PRINT@
406,SD:PRINT@411,SE;:PRINT@429,"
DOLLARS";:RETURN
1000 ' SCREEN 1
1010 GOSUB900
1020 M=1:M$="JAN":GOSUB930
1030 M=2:M$="FEB":GOSUB940
1040 M=3:M$="MAR":GOSUB950
1050 M=4:M$="APR":GOSUB960
1060 M=5:M$="MAY":GOSUB970
1070 M=6:M$="JUN":GOSUB980
1080 GOSUB990
1090 PRINT@484,"C=CONTINUE M=MEN
J P=PRINT";
1100 GOSUB170
1110 IFZ$="C" THEN1160
1120 IFZ$="P" THEN1290
1130 IFZ$="M" THENGOSUB190:GOTO29
0
1140 GOTO1100
1150 ' SCREEN 2
1160 GOSUB900
1170 M=7:M$="JUL":GOSUB930
1180 M=8:M$="AUG":GOSUB940
1190 M=9:M$="SEP":GOSUB950
1200 M=10:M$="OCT":GOSUB960
1210 M=11:M$="NOV":GOSUB970
1220 M=12:M$="DEC":GOSUB980
1230 GOSUB990
1240 PRINT@488," M=MENU P=PRINT
";
1250 GOSUB170
1260 IFZ$="P" THEN1290

```

```

1270 IFZ$="M" THENGOSUB190:GOTO29
0
1280 GOTO1250
1290 ' PRINTER ROUTINE
1300 CLS:PRINT@99,"IS THE PRINTE
R READY?";:PRINT@137,"(Y/N)";
1310 GOSUB170
1320 IFZ$="Y" THEN1350
1330 IFZ$="N" THEN140
1340 GOTO1310
1350 CLS:PRINT@99,"PRINTING..."
1360 PRINT#-2,CHR$(31):PRINT#-2,
TAB(7);A$;TAB(24);Y;
1370 PRINT#-2:PRINT#-2:PRINT#-2,
CHR$(30):PRINT#-2,TAB(8)"!";:PRI
NT#-2,CHR$(13);
1380 GOTO1390
1390 M=1:M$="JAN":GOSUB1580:GOSU
B1590
1400 M=2:M$="FEB":GOSUB1580:GOSU
B1590
1410 M=3:M$="MAR":GOSUB1580:GOSU
B1590
1420 M=4:M$="APR":GOSUB1580:GOSU
B1590
1430 M=5:M$="MAY":GOSUB1580:GOSU
B1590
1440 M=6:M$="JUN":GOSUB1580:GOSU
B1590
1450 M=7:M$="JUL":GOSUB1580:GOSU
B1590
1460 M=8:M$="AUG":GOSUB1580:GOSU
B1590
1470 M=9:M$="SEP":GOSUB1580:GOSU

```

(Continued on next page)

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BILLBARS (From Page 21)

```

B1590
1480 M=10:M$="OCT":GOSUB1580:GOS
UB1590
1490 M=11:M$="NOV":GOSUB1580:GOS
UB1590
1500 M=12:M$="DEC":GOSUB1580:GOS
UB1590
1510 PRINT#-2,CHR$(26);:PRINT#-2
,TAB(9)"!";:PRINT#-2,CHR$(13);
1520 PRINT#-2,TAB(8)" ";:PRINT#-2
,STRING$(58,"-");
1530 PRINT#-2,CHR$(26);:PRINT#-2
,CHR$(13);
1540 PRINT#-2,TAB(11)"0";TAB(19)
SA;TAB(29)SB;TAB(39)SC;TAB(49)SD
;TAB(59)SE
1550 PRINT#-2,CHR$(13);:PRINT#-2
,TAB(34)"DOLLARS":SOUND100,5
1560 GOSUB190:GOTO290
1570 ' PRINTER SUBROUTINES
1580 A(N,M)=A(N,M)*2:PRINT#-2,TA
B(4)M$;TAB(8)"!";TAB(10)" ";:PRI
NT#-2,STRING$(A(N,M),"*"):RETURN
1590 PRINT#-2,CHR$(26);:PRINT#-2
,TAB(9)"!";:PRINT#-2,CHR$(13);:R
ETURN
1600 ' LOAD TAPE ROUTINE
1610 CLS:MOTORON:PRINT@99,"INPUT
DATA FROM TAPE...";:PRINT@165,"
POSITION TAPE...";:PRINT@197,"PR
ESS 'PLAY'";:PRINT@229,"PRESS 'E
NTER'";:SOUND 100,5:INPUT E$
1620 OPEN "I",#-1,"BILLBARS"
1630 IF EOF(-1)THEN1660
1640 INPUT#-1,Y:FORN=1TO5:FORM=1
TO12:INPUT#-1,A(N,M):NEXTM,N
1650 GOTO1630
1660 CLOSE #-1:SOUND100,5
1670 GOSUB190:GOTO290
1680 ' SAVE TO TAPE ROUTINE
1690 CLS:MOTORON:PRINT@99,"SAVE
DATA TO TAPE...";:PRINT@165,"POS
ITION TAPE...";:PRINT@197,"PRESS
'PLAY' AND 'RECORD'";:PRINT@229
,"PRESS 'ENTER'";:SOUND 100,5:IN
PUT E$
1700 OPEN "O",#-1,"BILLBARS":PRI
NT#-1,Y:FORN=1TO5:FORM=1TO12:PRI
NT#-1,A(N,M):NEXTM,N:CLOSE#-1:S
OUND100,5
1710 CLS:PRINT@98,"TAPE SAVE COM
plete...";:PRINT@162,"DO YOU WAN
T TO BACK UP A TAPE? (Y/N
)";
1720 GOSUB 170
1730 IFZ$="Y"THEN1680
1740 IFZ$="N"THEN GOSUB190:GOTO2
90
1750 GOTO1720

```

SUBSCRIPTION RATES TO BE INCREASED

Effective May 1, subscription rates to the RAINBOW will be increased by \$4 per year to \$16 for an annual subscription of 12 issues. The single copy price was increased to \$2.50 on March 1.

Present subscribers to the RAINBOW may renew their subscriptions at the old rate of \$12 per year through May 15. After May 15, all renewal subscriptions will also be \$16 per year. We are offering this special renewal rate only for those who currently hold subscriptions to the RAINBOW and renew before May 15 or to those who subscribe for the first time for a period of more than one year before May 1.

Since its appearance in July, 1981, the RAINBOW has grown from four pages of editorial copy to 44. While advertising has played a major role in holding down the subscription price, continued printing and postage price increases necessitate this small increase in price. We hope you will understand the reason for it.

Canadian and Mexican subscriptions will be increased \$4 also. Canadian and Mexican subscribers will also be able to take advantage of the special renewal rate. However, subscribers in those two countries will be an additional \$2 per year postage and handling -- making the differential \$6 for Canadian and Mexican subscriptions. The new subscription rate to Canada and Mexico will be U.S. \$22 per year. Renewals from Canadian and Mexican subscribers will be accepted at U.S. \$18 until May 15.

We are especially sorry to have to make what is a significant increase for Canadian and Mexican subscribers. The reason for this increase is simply because of postal rules by Canada and Mexico -- which do not allow third class mailings from the United States and require the RAINBOW to be mailed in envelopes. This represents a major out-of-pocket cost for us and we are merely passing it along. Last month's issue of the RAINBOW cost 71 cents to mail to Canada and Mexico, not counting the cost of envelopes and handling.

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COMPARISON CHART	SUPER COLOR WRITER			THE COMPETITION		
System Size	4K	16K	32K	4K	16K	32K
TAPE Text space	N/A	8K	24K	N/A	2K	18K
ROMPAK Text space	25K	15K	31K	N/A	N/A	N/A
DISK Text space	N/A	6.5K	22.5K	N/A	0.5K	16.5K
Right Justify		YES			NO	
Video Window		YES			NO	
Edit any ASCII File		YES			NO	

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12800	3000	RESERVED
12800	3000	COMMUNICATION STATUS ADDRESS
12800	3000	COMMUNICATION DATA ADDRESS
12800	3000	TRIGGER LATCH ADDRESS
12800	3000	DISK DRIVE SELECT LATCH ADDRESS
12800	3000	CASSETTE SELECT LATCH ADDRESS
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12800	3000	CRT VIDEO MEMORY
12800	3000	KEYBOARD ADDRESSES (FOR KEY-REPEAT)
12800	3000	KEYBOARD DATA
12800	3000	PRINTED DATA
12800	3000	RESERVED
12800	3000	POC INTERRUPT VECTOR
12800	3000	COMMUNICATIONS INTERRUPT VECTOR
12800	3000	RESERVED
12800	3000	IN-RECEIVE INTERRUPT
12800	3000	BASIC ROM
12800	3000	IO BUFFER
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12800	3000	END OF THE SYSTEMS
12800	3000	END OF THE SYSTEMS
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Software Review...

QUEST WILL KEEP YOU UP LATE QUESTIONING

QUEST is advertised as a "new idea in adventure games" and it is. It is also entertaining, a lot of fun and exercises the mind.

Too, **QUEST** (Aardvark-80, 2352 S. Commerce, Walled Lake, MI, 48088, \$14.95) is a lot of fun to play. But, it is more than a simple hack-and-slash adventure and it makes for quite a bit of enjoyment.

I couldn't get away from **QUEST**. There were a couple of times when I tried to leave and go to bed, but it seemed like I was in a good position to attack Moorlock's Castle...until something happened.

This game uses the low-res screen to draw a map of a land of castles, towers, ruins and the like. Each type of thing is shown by a symbol -- and your position is shown by a symbol, too. You move around using the arrow keys and, when you get near something it shows up on the screen. A message line at the bottom alerts you to what it is.

The screen starts out almost blank, with just you, Moorlock's Castle, a river and a couple of cities shown. You have to discover the location of the other places -- and discover how to get into them yourself.

You are not the only person in this land. There are bands of wizards, pilgrims, soldiers and the like. Sometimes some of the other bands have hired soldiers for protection. You can run away from these groups, try to fight or make friends. Sometimes your overtures are accepted, other times not. Like life, no?

By the way, your band can buy weapons and implements in the cities. This frequently gets you into a bargaining situation with a shopkeeper. But, you need gold to buy...and if you are long on gold and short on men, they won't be able to carry it all. And, you need food for the men. Or they'll die of starvation. The more men you have the more you can carry. But the more food you need.

This is an easy-to-play game that is a lot of fun. The combinations are endless and, frankly, I never missed not having the high-res screen. It's really not necessary.

You will really enjoy **QUEST**!

Oh...did I mention Moorlock's Castle is on the other side of the river from you and that there isn't a bridge???

Software Review...

CAVE HUNTER IS PACMAN WITH A TWIST

At first **CAVE HUNTER's** game layout looks familiar, like that of **PACMAN**. But ol' P-M has it easy compared to what you have to go through to rack up the points in **CAVE HUNTER**.

This program, (from Mark Data, 23802 Barquilla, Mission Viejo, CA, 92691, \$24.95) is in machine language and does have those little dots, a PAC-like figure and some small villains who try to do you in.

BUT...there is more. You see, to be a **CAVE HUNTER**, you have to actually hunt through a cave and find something in it. And that's the rub, because it seems the little villains know where the loot is. Or, at least, they know how to keep you from getting either (1) it or (2) back to the surface.

The purpose of the game is to venture down into the cave, get the treasure and return to the surface. You steer your **CAVE HUNTER** with your joystick and try to avoid the bad guys.

As someone said: "Easy it isn't." But, as someone *must* have said: "Fun, it is."

Response to the joysticks is good and the action is fast-paced. There is a lot of planning involved, and you do get some "free time" -- you can stay on the surface while you plot your next move. Of course, if you stay there too long, the bad guys figure out where you are and it's difficult to get back into the cave.

In a word, **CAVE HUNTER** is enjoyable.

Software Review...

EL CASINO IS FOR ALL VEGAS ADDICTS

Before author Arnold Pouch accuses me of not knowing what the original **El Casino** is, I want to assure him -- and you -- that I have visited that pleasure dome in Freeport, the Bahamas. It is reputed to be the largest casino in the world.

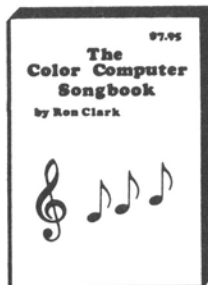
In some ways, **EL CASINO** (from Superior Graphic Software, 406 Little Mountain Road, Waynesville, NC, 28786, for \$49.95) is the largest casino of its type in the world, too. It is three programs on tape or disk that cover three of the most popular game of chance in any casino.

All, too, are done with Pouch's Motion Picture Programming (MMP). This offers some of the most imaginative graphics we have seen for the CoCo.

(Continued on Page 28)

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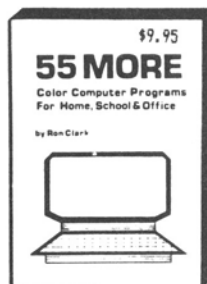
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CASINO (From Page 25)

Of particular interest is the Craps game, which gives you a wide variety of bets to make and keeps track of all of them on the graphics screen. No shifting screens to keep up with the four players who can stand at the EL CASINO table at one time!

But the real turn-on is when its time for the "bones" to roll! A hand at one end of the table shakes back and forth and then opens up as the dice come rolling toward you. Not a flicker in the graphics, folks. Of course, the game keeps track of all your bets -- and almost all of the traditional ones are available. Even the "hard ways."

Blackjack, also played in EL CASINO, uses graphically displayed cards, somewhat similar to a number of the arcade games. It does a good job and its also nice to know you won't get thrown out of this casino for card-counting. The program will count cards for you!

Lastly are Slot Machines, which operate fairly much the way all slots do. Motion Picture Programming does give this interesting graphics.

All three programs are also available individually.

Software Review...

SPACE INVADERS BY COMPUTERWARE

Space Invaders is a game, frankly, which captures the imagination of thousands. The other day I was in a large airport and, with some time between connections, I stopped in at the arcade to see what was new.

As usual, there were a few things new, but there were a number of the old standbys around, too. Space Invaders was one of the old friends. And, as usual, there were people waiting to play.

If Space Invaders is the Monopoly of the electronic generation (gee, now there's some philosophy. And I bet you thought you were reading a review!), then everyone will have one version or another eventually. And you could do far worse than to buy COLOR INVADERS from Computerware (Dept. C, Box 668, Encinitas, CA, 92024, \$24.95 on tape, \$29.95 on disk).

Is there anyone out there who doesn't know how to play Space Invaders? I thought not, so we'll do without the explanation of the game itself.

However, the Computerware COLOR INVADERS game is in machine language, which means you have excellent control of the joystick in

(Continued on Page 31)

CO-RESIDENT EDITOR/ASSEMBLER (CORES9)

CORES9 is a complete full function editor/assembler package that will allow you to create, edit and assemble 6809 machine language programs for the color computer. It features a powerful full function text editor and supports the entire 6809 instruction set with all addressing modes, forward and reverse label references, will output object code directly to memory or "CLOADM" compatible tapes and much more.

Price \$39.95.



TEXT EDITOR

This program is a line/character oriented text editor for the color computer, that will enable you to create and edit text files for Basic programs, letters, text data files, or almost anything you might want to put on paper. It features functions for adding, inserting, deleting, moving and copying text lines or paragraphs; powerful string search and replace commands, single and automatic line numbers and line editing with 9 sub commands to insert, delete, change, add and remove individual or multiple characters. Tape commands allow you to save, load, append, and skip tape files; also it is compatible with Basic ASCII tape formats. A MUST HAVE PROGRAM!!

ONLY \$19.95

SYSTEM MONITOR (TRSMON)

Trsmon is a 2K system monitor program that will allow you to explore the workings of the color computer. It features 9 debugging commands, tape load and save compatible with Basic "CLOADM", up/down load via RS232 port, terminal package that allows the color computer to be used as a terminal at baud rates up to 9600 baud and a printer driver to direct display output to the printer for memory dumps, disassemblies etc. The program is position independent so it can be moved anywhere within the system memory. A very powerful tool at a very reasonable price.

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EXCITING NEWS FOR COLOR COMPUTER USERS

FLEX, OS-9 and the Radio Shack Disk System ALL on the SAME Color Computer

Would you believe that you can run FLEX, OS-9 and Radio Shack disk software on the same Color Computer, and all you have to do is change the disk? That's right, just change the disk. If you have a 32K Color Computer with the Radio Shack disk system, all you need to do is make a trivial modification to access the hidden 32K, as described in the Feb. issue of COLOR COMPUTER NEWS and the March issue of '68' Micro. You can get FLEX from us right now. OS-9 will be ready by summer. Please note that this will only work with the Radio Shack disk system and 32K/64K memory chips that RS calls 32K. Maybe they put 64K's in yours, too. If you don't have a copy of the article, send a SASE and we'll send it to you.

Using this system to run FLEX and OS-9 has many advantages. First, it gives you 48K from zero right up to FLEX. This means that **ALL FLEX compatible software will run with NO MODIFICATIONS and NO PATCHES!** There are no memory conflicts because we moved the screen up above FLEX which leaves the lower 48K free for user programs.

What you end up with is 48K for user programs, 8K for FLEX and another 8K above FLEX for the screens and stuff. We are working on a multi screen format so you can page backward to see what scrolled by and a Hi-Res screen that will enable us to have 24 lines by 42 character display. That's better than an Apple!

We also implemented a full function keyboard, with a control key and escape key. All ASCII codes can now be generated from the Color Computer keyboard!

We also added some bells and whistles to Radio Shack's Disk system when you're running FLEX or OS-9. We are supporting single or double sided, single or double density, 35, 40 and 80 track drives. If you use double sided drives, the maximum is three drives because we use the drive 3 select for side select. When you are running the Radio Shack disk, it will work with the double sided drives but it will only use one side and only 35 tracks. Using 80 track drives is okay, but will not be compatible with standard Radio Shack software. You can also set each drive's stepping rate and drive type. (SS or DS SD or DD)

In case you don't understand how this works, I'll give you a brief explanation. The Color Computer was designed so that the roms in the system could be turned off under software control. In a normal Color Computer this would only make it go away. However, if you put a program in memory to do something first (like boot in FLEX or OS-9), when you turn off the roms, you will have a full 64K RAM System with which to run your program (FLEX or OS-9). When the roms are turned off, it is as if you had removed them from the computer. They are gone!

Now, we need the other half of the 64K ram chips to work, and this seems to be the case most of the time, as the article states. Of course, you could also put 64K chips in.

We decided that this was the best way to run FLEX and OS-9 on the Color Computer because it does remove the roms from the memory map and leaves the full 48K for user programs. If you just put in memory for FLEX and use the Basic hooks for I/O, all you have is a little over 30K for user programs. In addition, very few FLEX programs will run without being modified and some won't run very well, if at all (our DATAMAN+ for example). Let me state it again. **ALL FLEX COMPATIBLE PROGRAMS WILL RUN WITHOUT MODIFICATION!!!** and the same goes for OS-9!

It is also the **ONLY** way OS-9 will run because 30K is just not enough.

Some neat utilities are included.

MOVEROM moves Color Basic from ROM to RAM. Because it's moved to RAM you can not only access it from FLEX, you can run it and even change it!! You can load Color Computer cassette software and save it to FLEX disk. Single Drive Copy, Format and Setup commands are also included.

If you don't have a Color Computer, we can sell you one complete with 64K ram, 24K rom, Single RS disk drive and FLEX for only \$1,490, set up and ready to go.

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INVADERS (From Page 28)

your battle against the alien critters. Too, the aliens move across the screen well, and quickly. The play is good and in real time. Its a fine version.

COLOR INVADERS has eight skill levels and a maximum of 999,999 points. Computerware asks for notification of anyone who makes more than 15,000 on skill level eight. In short, it is a demanding game.

I liked **COLOR INVADERS** and you will, too.

Review...

NEW SYSTEM CARD HAS IT ALL

Do you spend a lot of time thumbing through *Getting Started With Color Basic* and *Going Ahead With Extended Color Basic* looking for the exact syntax for some command that isn't quite explained to your satisfaction on the system card you got with CoCo?

Did you ever wish there was just a little more information somewhere...that was easy and quick to get to?

Enter the **TRS-80 COLOR BASIC AND EXTENDED SYSTEM REFERENCE CARD** from Nanos Systems Corp., P. O. Box 24344, Speedway, IN, 46224, (\$4.95). It is a shirt-pocket foldup card that's 16 pages long and just what the doctor ordered!

And, just like CoCo, it is in eight colors -- plus grey, white and black. No more trying to figure out whether this CHR# puts a red or a magenta block in such-and-such a place. Its all here, and in color.

Want to know when **PLAY** and **SOUND** shift octaves? The notes are represented on a staff ... and the notes shift colors, too, when the octaves shift.

There is a very well-done illustration of **PRINT USING**, all error messages with short explanations, and a list of derived functions. Also: detailed instructions for playing music, making a circle and drawing. There are the CoCo's color groupings, a screen line layout and a line printer control code command set (for the LP VII).

We are very impressed with this product and feel it will be helpful to anyone who programs in BASIC.

Review...

LIGHT PEN OFFERS INTERESTING IDEAS

One of the really interesting possibilities for a few different applications with our CoCo comes from such gee-whiz things as a light pen.

One specifically made for CoCo is now available from Moses Engineering (Regent Drive, Route 7, Greenville, SC, 29609, \$19.95 kit, \$39.95 assembled with joystick).

The Moses light pen uses the right joystick and the JOYSTK(0) reading to operate. It senses the brightness of colors on the screen and, if the software gets a reading matching the brightness, it can be programmed to do various things. Needless to say, this opens up all sorts of possibilities.

This particular product comes in two forms -- assembled and with a joystick attached and unassembled. Even the most klutzy of you need not fear the kit -- it was easy to assemble, took only 20 minutes, and did not require any messing with the CoCo itself.

To do the assembly, just open the joystick up, remove the innards, drill a hole for a phono jack (which is supplied) and solder two connections from the phono jack to two clearly marked parts of the joystick control. Put the whole thing back into the case and screw it back together. (No kidding, friends, I really can't do this kind of stuff well, but it was easy.)

You can buy the kit assembled for \$20 more, and you get another joystick. The modification does not hurt the joystick.

Then, when you want it, you plug the light pen in the phono jack on the joystick and you're ready.

The sample programs Moses Engineering supplies are just that, samples. They are not sophisticated, but are to show what the light pen can do. It has excellent potential.

In one program, you simply point the light pen at the end of a cannon, and, after reacting to the reading, the cannon fires at the top of the screen. In another, the screen is divided into three colors and the pen reads the relative brightness of the colors and tells you which one it is. These are, however, quite simple programs which -- being in BASIC -- take some time to react. It boggles the mind what one might do with some of the really good software -- in BASIC or machine language -- were it adapted to the light pen.

We believe you'll find this an interesting accessory and will open up several programming possibilities for you.

? #-2, (From Page 1)

subscription rates. Honestly, we've held off on them as long as possible. I did a little checking with some of you by telephone, and the overwhelming response was that the RAINBOW was worth our new base rate of \$16. Please note: All of you who have helped us get started can renew your subscriptions at the current \$12 base rate for a limited time. Its a way of mixing the bad with the good and, in a way, saying "thank you" for your confidence in our ability to provide you with a good magazine in a timely manner.

Our Canadian and Mexican subscribers will note that their postage differential also increases. I am very sorry about this, but there is just no option. Canadian and Mexican postal regulations require us to mail to those countries in certain ways -- and the ways are expensive. Believe me, we make absolutely no money on the portion of Canadian and Mexican subscriptions we are forced to charge for postage.

Of course, Canadians and Mexicans will be able to take advantage of the special renewal rate on our base subscription. But, those renewals must include the additional postage charges. If anyone has an idea of a way to reduce these charges, we'll do it -- and pass the savings on back to you either in a subsequent announcement or in a refund.

Now to the good news! For all those who don't like to key in our listings, we call your attention to the announcement inside about RAINBOW ON TAPE. We've thought long and hard about doing this -- and finally arranged a way to handle it so that you can get a quality product at the lowest possible cost. Incidentally, RAINBOW ON TAPE will be mailed first class mail, so it should come within a couple of weeks after you receive the

RAINBOW. For those of you who choose to subscribe to RAINBOW ON TAPE, you'll get a price break and quicker delivery. There will be no documentation sent with RAINBOW ON TAPE, the documentation is in the magazine itself.

Incidentally, the RAINBOW is now a truly international publication. A separate edition is being published in Australia for Australian and Asian markets through a license to Gregg Wilson of Australia. Gregg, who's a most interesting and charming fellow, also holds license rights to much of the software you can buy through our advertisers in this country and Canada.

Finally, we're planning an announcement shortly that should be of interest to everyone who purchases software. We hope it will be an answer to the problem of availability of advertised software. More about this later.

And, thanks to all of you for your interest and continued support of the RAINBOW!

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THREE NEW WORD PROCESSORS OFFER A VARIETY OF FEATURES

By Lawrence C. Falk

Three more word processing systems have hit the market since our last look at these programs, and all three have a number of excellent features to offer for the CoCo owner looking for a way to have his computer (and printer!) help him put words on paper.

Among the systems is Tandy Corp.'s entry into the field, appropriately named *COLOR SCRIPSIT*, Nelson Software's *SUPER COLOR WRITER* and *TEXTPRO* from Cer-Comp. All three programs are in machine language, which give a fast reaction to operator input and all have a variety of features. These programs, and the four word processors reviewed in the December edition of *the RAINBOW*, give a wide range of software from which to choose. Perhaps no single computer has as much word processing software available as does CoCo. And that is a point which should not be missed by your friends seeking to buy a computer.

Too, we believe that the preponderance of word processing software means that CoCo owners will have a variety of other business and utility oriented programs to choose from in other areas as well. Software support? Here it is in abundance -- for every need and every pocketbook.

TEXTPRO is, as we said, a machine language program which uses the "regular" screen to display letters -- that is, black letters on a green background for upper case. It is a line-based text editor, in that each line is numbered, by the writer or by the program.

You can number lines manually, much the same as you number BASIC programs. Or, you can let *TEXTPRO* do it. Its much easier to assign the task to the program -- and once that is done *TEXTPRO* does provide a simple way to insert lines: All you do is insert a line by using a number in between those already in existence. Since this is so much like the way you program in BASIC, it comes naturally.

TEXTPRO also uses commands similar to BASIC commands to perform many of its functions, such as copying lines from one part of the text file to another, deleting lines and moving them. One would suppose it could also be used to perform major surgery on BASIC programs -- so long as they were saved in the ASCII format. We have not tried this, but -- especially with the line numbers making it easy -- it seems a real interesting possibility.

The program's "replace" function is excellent, it will replace one text string with another with the blink of an eye. However, its "search" does not lend itself to the line-basis format, since it displays *all* the lines which contain a particular text string -- and these can scroll off the screen.

TEXTPRO, as *COLOR SCRIPSIT* and *SUPER COLOR WRITER*, has a true "scroll" through the text buffer (the characters you input). Its "scroll" is based more on lines, however, sometimes making it a bit difficult to follow in the text entry mode. However, in the edit mode, the cursor can be moved through the buffer at will. The editor is efficient and easy to use and the commands to do the most common things are easy to learn.

COLOR SCRIPSIT uses a red screen with a yellow "status line" on the bottom which tells you at a glance what amount of memory is left, what line you are on and what position in that line the cursor presently occupies. This is the most sophisticated status update of any of the seven word processors we have seen and is very similar to the status line which all other versions of *Scrpsit* use. There is also a little box which tells you whether you are in capital or lower case letters. Upper case letters are shown backgrounded in red -- similar to the black on the familiar text screen.

COLOR SCRIPSIT also uses the "regular" 32-character screen, but at any time you wish.

As far as editing is concerned, with a difference. As reported previously in *The Pipeline*, it flips screens on the same line to give you 64 characters of width in the same line. However, once the display is "flipped," you cannot see the first part of the line. You have true scrolling in that you can move the cursor through the text at will

As far as editing is concerned, you can insert, delete and change characters easily. This program also uses a device called wordwrap (as does *SUPER COLOR WRITER*), which keeps words from breaking up at the end of a line. *COLOR SCRIPSIT* goes this one better, however, and allows for hyphenation of words. The program allows you to set the amount

(Continued on next page)

of characters you want it to use in looking for possible places to hyphenate. Once you place the program in the hyphenation mode, it moves through the text and locates all the possible hyphens. When it finds one, it gives you the option of moving the hyphenation to a logical point or just leaving the word alone.

COLOR SCRIPTSIT also supports finding and replacing text. It has the added feature of giving you an option as to whether you want to change a particular string after it has been found.

This is pretty important. As an example, suppose you asked someone to type in something for you, and the person typed in all the letter "i's" without capitalizing them. You could use this feature to go through the text and locate the lower case "i's" and make them "I's." The problem is, the program would also locate all the "i's" in the middle of words as well. Because you can give a yes/no decision to any change, it makes this sort of thing easy to use.

SUPER COLOR WRITER is now available. It uses a full-scroll text buffer and a "normal" screen, with the green and black reversed -- much as does **WORD PROCESSOR/TEXT EDITOR** does. This makes the screen very readable in the standard 32-character line. And, if you don't like the color set, you can switch it (to orange letters!).

This program has many of the same features the others do. Every function has a control key, and there are a large number to keep track of. For this reason, probably, a "help" screen is available -- showing the most-used commands. This is a nice touch.

The **CLEAR** key is the control. As an example, to delete a character, you hit **CLEAR** and "D". To get the help screen, its **CLEAR** and "H". The program has a "status line" at the top of the screen and the cursor changes colors, depending on what sort of mode you're in. This is helpful in keeping things straight.

SUPER COLOR WRITER has a unique feature in its search command, the ability to use a "wild card" to mask letters. Now, let's say you never learned the old rule that goes "i before e, except after c" and you have spelled several words like "recieved," "recieve" and so on. You want to change them. You can "mask" the "ie" out, and find all occurrences of the word with either spelling.

All three programs do all of the "simple" things like move and copy text, center material and justify copy. Keep in mind these are difficult to do on a typewriter -- and extremely easy with a word processing program. Also remember that studies show you can type much more quickly on a computer screen than on a piece of paper.

Getting information in is only half the battle, however. The other half is in the printing. All programs allow you to set such things as right and left margins, line spacing and number of lines per page. All also allow you to set "headers" and "footers," -- those standard lines that run on the top and bottom of the page when you have long documents. All also allow the computer to number the pages for you.

TEXTPRO and **SUPER COLOR WRITER**, however, also allow you a great amount of leeway in the use of control codes. Control codes are those things you send to a printer to change the type size and the line. For instance, in the **LP VII**, the **CHR\$(30)** is a control code to run double-wide letters.

These two programs allow you to


HELP STAMP OUT **BIG UGLY GRAPHICS**

STAMP OUT
BUGME's

USE
MPP

DON'T

- BUG ME -



USE
MPP

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imbed the control codes into your text, and change things "on the fly." Too, both also allow you to change the parameters you selected to print your document while you are doing the printing. This can be real important if you are trying to set a half-column, go to a full column for several lines, and then go back to a half column. It also means if you are using a printer which has different character sets, you can vary the character sets just by typing in a control code.

All three programs use tape for storage. *TEXTPRO* comes in a disk version as well. *SUPER COLOR WRITER* is advertised in both Rom Pak and disk versions, but we did not receive them for review. Since the tape version is in machine language, it is difficult to adapt to disk, but, I suppose, could be done. With *COLOR SCRIPSIT* on a ROM Cart, you cannot use a disk drive, because the disk will have to use the same port. *COLOR SCRIPSIT* does have the plug-in-and-run advantage, and does not use CoCo memory for the program.

As with the four word processors we reviewed earlier, each of these programs has some very real advantages. We hope this rundown will help you choose the right one for your uses.

TEXTPRO, by Bill Vergona, Cer-Comp, 5566 Richochet Ave., Las Vegas, NV, 89110, \$39.95.

COLOR SCRIPSIT, by Robert Kilgus, at Radio Shack dealers and stores, \$39.95.

SUPER COLOR WRITER, by Tim Nelson, Nelson Software, P.O. Box 19096, Minneapolis, MN, 55419, \$49.95 tape; \$74.95 Rom Pak; \$99.95 disk.

Software Review...

MONEY MINDER II WILL HELP BUDGET

MONEY MINDER II from Harmonyacs (P.O. Box 1573, Salt Lake City, UT, 84110-1573, \$8.95) is a fine addition to a software library and a useful program for anyone who wants to keep track of where his money is going.

Designed to operate on the 16K CoCo, the program allows you to set up to 56 categories of expenditure and assign checks to any of them. It also will work against a budget, so that you can place deposits in the categories as you wish and then monitor how you draw checks against them.

The large number of categories can be especially useful when you come to income tax time. And, since there are also printout and data tape save routines, you can keep track of things all year long and get a printout at any time.

If we have one complaint about *MONEY MINDER II*, it is the documentation. It would be greatly improved with some examples running all the way through the text and, we believe, would help the user. We were impressed by the program but wished access to its features had been made easier.

That being said, *MONEY MINDER II* does have some fine features. We particularly liked the way category balances are displayed in that if you only use part of the categories the program will not force you to "look at" a page or two of empty screens.

Too, a routine to allow you to look at the last entry in each category is included. This is especially useful when you wonder just "where you are" in the program. Despite the best of intentions, you know you're not going to enter in checks every day as you write them. The last entry feature works with keyboard or data tape entries -- whichever is last.

Finally, there is a particularly helpful feature called "Transfer Balances." Simply put, it allows you to handle your entries a week (or month, or whatever) at a time. It keeps a running total of balances forward and does not require you to read in long amounts of data from tape to get "up to date."

We believe you will be pleased with this program.

Software Review...

DANCING DEVIL IS DEVILISHLY FUN

You, or your kids, can keep busy for hours with *DANCING DEVIL*. It is a good program that will provide a lot of enjoyment.

Available from Tom Mix Software (3424 College N.E., Grand Rapids, MI, 49505, for \$14.95), this program lets you combine both musical and artistic talents.

Its somewhat similar to another program available for the black and white TRS-80's, but now it is available for the CoCo with all the enhancements CoCo can give it.

DANCING DEVIL features a little devil who will dance to any song you want to enter into the Computer. You do this through a menu system that is easy to use and the note selection is very easy. Even if you don't want to use a song, *per se*, you can just use notes.

Then, in step two, you program in the steps the devil can make in connection with the notes. Again, a

(Continued on next page)

DEVIL (From Page 35)

simple menu format is used to make things extremely easy. And, the devil will do a devilish number of things, from jumps to the Charleston.

Finally, you select the performance item on the menu, a curtain goes up, and the devil does his stuff. You can choose how fast you want him to run through it, and how many times (1 to 255) you want him to repeat. When the performance is over, the devil bows and the curtain goes down.

You can save your routines to tape and load them back from memory. In addition, there are two pre-programmed routines for a demonstration.

DANCING DEVIL rates a "NEAT!" from the resident 13-year-old. A major accolade!

Music...

JULIE'S SONG...

Julie Kerr, 10, of Bellevue, Wash., is as interested in music as she is in computers. So, she wrote the following program as an example of how CoCo can be used in a musical application.

The program generates a random sound for a couple of seconds, then starts at another random sound. You can maneuver the second sound up or down the scale until you think it matches the first. The program will tell you how close you came to a match!

Julie's mother, by the way, says it is only Julie among her family who consistently gets the "Tuned By An Expert" message.

This program's idea, and the code for it, was Julie's idea and inspiration. We hope you like it.

The listing:

```
5 ' TUNING
7 ' BY JULIE KERR
10 CLS5
20 PRINT "LISTEN TO THE FIRST SO
UND"
30 PRINT "THEN LISTEN TO THE SEC
OND SOUND"
40 PRINT "TUNE THE SECOND SOUND
TO THE"
50 PRINT "FIRST SOUND BY PRESSIN
G <L> TO"
60 PRINT "GO LOWER AND <H> TO GO
HIGHER."
70 PRINT "WHEN YOU THINK IT'S IN
TUNE,"
80 PRINT "PRESS <T>."
90 PRINT
100 FOR T=1 TO 1500:NEXT T
```

```
110 N=RND(100)+50
120 SOUND N,100
130 T=RND(100)+50
140 SOUND T,2
150 C$=INKEY$
160 IF C$="H" THEN T=T+1
170 IF C$="L" THEN T=T-1
180 IF C$="T" THEN GOTO220
190 IF T=0 THEN T=1
200 IF T=201 THEN T=200
210 GOTO140
220 IF T=N THEN PRINT"TUNED BY A
N EXPERT!":GOTO260
230 IF T>N-10 AND T<N+10 THEN PR
INT "VERY GOOD":GOTO260
240 IF T>N-20 AND T<N+20 THEN PR
INT"YOU NEED A LITTLE MORE PRACT
ICE":GOTO260
250 PRINT "PRACTICE MAKES PERFEC
T"
260 PRINT"THE TONE WAS"N"- YOU C
HOSE" T
```

FREE GAME --- BREAK OUT

SEND A S.A.S.E. FOR A FREE LISTING OF THIS PROGRAM, WRITTEN IN MACHINE LANGUAGE, VERY FAST, HAS ON SCREEN SCORING, ETC., NEEDS JOYSTICKS. COMES WITH COMPLETE INSTRUCTIONS ON HOW TO ENTER IT AND RUN THE GAME.

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If you don't like spiders, don't play *WILD, WILD WEB*, because in it you are a spider and your object is to get a good, wholesome lunch.

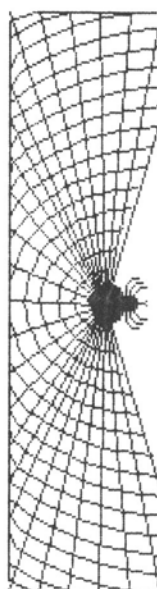
While there are many differing opinions about what a good, wholesome lunch might consist of among us humans, there is little debate among spiders. They like ants. (We are told they like moths for dinner.)

This game, brought to you by the IMB dynamic duo of Fred Scerbo and Dale Haggerty (a.k.a. Snail), will let you sit in your web and try to get some ants for lunch. Use the right joystick to direct your little web and the "fire" button to shoot out a web at the ant. You're measured on how long it takes you.

As always, please remember this game is for your personal use and pleasure and is not to be copied for any other reason. Similarly, the routines are for use in the game, but not for use in any software you write.

Get those ants!

```
1 POKE65495,0:CLR500:CLS0:SR=3
  C=1:GOSUB3:GOTO9
3 SR=3:C=C+1:P=CHR$(128):FORI=
  2T014:FORJ=4T013:SET(J,I,C):NEXT
  J:NEXTI
5 FORK=0T011STEP11:FORJ=18T023:S
  ET(J+K,2,C):NEXTJ:FORJ=17T024:SE
  T(J+K,3,C):NEXTJ:FORI=4T014:FORJ
  =16T025:SET(J+K,I,C):NEXTJ:NEXTI
  :NEXTK
7 FORK=0T07STEP7:FORJ=39T058:FOR
  I=2T07:SET(J,I+K,C):NEXTI:NEXTJ:
  FORI=3T06:SET(59,I+K,C):NEXTI:FO
  RI=4T05:SET(60,I+K,C):NEXTI:NEXT
  K:RETURN
9 PRINT@257,P$;:FORY=1T028:READA
  :PRINTCHR$(A);:NEXT
11 DATA105,108,108,117,115,116,1
  14,97,116,101,100,128,128,128,10
  9,101,109,111,114,121,128,128,12
  8,98,97,110,107,115
13 PRINT@329,P$;:FORY=1T012:READ
  A:PRINTCHR$(A);:NEXT
15 DATA98,111,110,117,115,128,12
  8,128,103,97,109,101
17 PRINT@399,CHR$(98)+CHR$(121);
19 PRINT@448,P$;:FORY=1T031:READ
  A:PRINTCHR$(A);:NEXT
21 DATA102,114,101,100,128,115,9
  9,101,114,98,111,128,128,97,110,
  100,128,128,100,97,108,101,128,1
  04,97,103,103,101,114,116,121
23 FORJH=1T02:GOSUB3:NEXTJH
25 W$="BU2U7R2D6FEU4R2D4FEU6R2D7
  G2L2HGL2H2BD2BR12"
27 IL$="U9R2D9L2BR4U9R2D7R4D2L6B
  R7U9R5F2D5G2L5BE2U5R2FD3GL2"
29 EB$="U9R7D2L5D2R3DL3D2R5D2NL7
  BR2U9R5F2DGDFDGL2L5BE2U2R2FGL2BU3
  U2R2FGL2"
31 PMODE3,1:PCLS5:SCREEN0,0
33 DRAW"S4BM16,16C3U4L2R4BR4D4U2
  R4U2D4BR4NR4U2NR2U2R4"
35 DRAW"S16BM10,60C4"+W$+IL$
37 DRAW"BM70,110"+W$+IL$
39 DRAW"BM130,160C3"+W$+EB$
41 FORY=0T060STEP60:FORI=34T0124
  STEP30:PAINT(I+Y,55+WL),4,4:NEXT
```



```
I:WL=50:NEXTY
43 FORI=16T0220STEP30:PAINT(I,1
  53),3,3:NEXTI
45 LINE(0,0)-(256,192),PSET,B:SC
  REEN1,1:FORI=2T0100STEP8:LINE(0,
  92+I)-(30+I,192),PSET:LINE(124+I
  ,0)-(256,0+I),PSET:NEXT
47 FORI=0T024STEP8:LINE(0,94)-(3
  2-I,192),PSET:LINE(256,100)-(256
  -I,0),PSET:NEXT
49 FORWA=1T02000:NEXT:CLS0
51 PMODE4,1:PCLS5:SCREEN0,0
53 AR$="C0R18L2NE6U3L3D3L8U3L3D3
  L8U3L3D3U5L3D5U3L3D3F2R7NG5U2R8D
  2RND5R2U2R5NF7":DRAW"S2BM118,92;
  "+AR$
55 DRAW"C0S2BM118,122L18R2NH6U3R
  3D3R8U3R3D3R8U3R3D3U5R3D5U3R3D3G
  2L7NF5U2L8D2LND5L2U2L5NG7"
57 DIMA(6)
59 DIMB(6)
61 GET(108,89)-(129,95),A,G
63 GET(107,119)-(128,125),B,G
65 PMODE4,1:PCLS5:SCREEN0,0
67 CIRCLE(126,41),10,0,.9
69 PAINT(126,40),0,0
71 CIRCLE(126,52),4,0
73 PAINT(126,52),0,0
75 DRAW"S4BM126,50;C0L8G3D3BM126
  ,50R8F3D3BM126,52L6G3D3BM126,52R
  6F3D3BM126,54L4G3D3BM126,54R4F3D
  3BM126,54D5NF3NG3"
77 DIMS(24)
79 GET(110,32)-(142,60),S,G
81 PCLS5
83 FORI=0T090STEP15:LINE(126,48)
  -(0,I),PSET:LINE(126,48)-(256,I)
  ,PSET:NEXT
85 FORI=32T0224STEP16:LINE(I,0)-
  (126,48),PSET:NEXT
87 FORI=2T0146STEP9:CIRCLE(128,4
  5+(I/2.5)),3+I,0,1.3,.5,1:NEXT
89 PUT(111,40)-(143,68),S,AND
91 I=126
93 SCREEN1,1
95 TIMER=0
97 C=RDND(10):IFC=>6THEN101:IFC<=5
  THEN107
```

(Continued on next page)

A SELF-MAILER SAVES TIME AND ENVELOPES

Dr. Lane Lester of Liberty Baptist College in Lynchburg, Va., didn't plan to send in a submission, but we're very impressed with the letter he mailed the other day and would like to pass its concept along as a hint to those who want to use their CoCo as a word processor and don't want to hassle with envelopes.

Dr. Lester has formatted his word processing program to use the first page as a self-mailer that doesn't require an envelope. Using plain white printer paper, he sets his return address on the left-hand margin 26 lines down from the top of the paper. Then, he starts the address of the person to whom he is writing 33 lines down and 35 spaces

(Continued on Page 40)

```

99 GOTO115
101 FORY=1T06:I=I+4:IF I=>230THE
N103ELSE105
103 COLOR5,5:LINE(I,150)-(21+I,1
56),PRESET,BF:I=10
105 PUT(I,150)-(21+I,156),A,PSET
:NEXT:GOTO97
107 GOSUB115:FORY=1T06:I=I-4:IF
I<=10THEN109ELSE111=230
109 COLOR5,5:LINE(I+4,150)-(25+I
,156),PRESET,BF:I=230
111 PUT(I+4,150)-(25+I,156),B,PS
ET:NEXT:GOTO97
113 GOTO113
115 IFPEEK(339)=255THEN101
117 L=JOYSTK(0)*4
119 PLAY"V3105L255BC"
121 COLOR0,0:LINE(127,70)-(L,151
),PSET:COLOR5,5:LINE(127,70)-(L,
151),PRESET:COLOR0,0
123 IFPOINT(L,153)=5THENRETURN
125 SOUND1,1:COLOR0,5:FORWS=3TO9
STEP3:CIRCLE(L,152),WS,0,.6:NEXT
WS:LINE(I-8,146)-(28+I,158),PRES
ET,BF:DRAW"S2BM"+STR$(RND(200)+2
2)+", "+STR$(RND(30))+AR$:LO=RND(
2):IF LO=>1THEN I=20ELSEI=220
127 TA=TA+1:IFTA<15THEN101
129 TE=TIMER:SE=INT(TE/60)
131 POKE65494,0:SCREEN1,0:FORW=1
TO5:PLAY"O1T55BCBCBC":NEXT:FORW=
1TO1500:NEXT

```

```

133 CLS0:PRINT@228,"YOU TOOK";:P
RINTUSING"####.##";SE:PRINT" SE
CONDS.";

```

```

135 FORI=1TO3000:NEXT:RUN
137 REM 'THE WILD WILD WEB' BY
FRED B.SCERBO & DALE 'SNAIL'
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```



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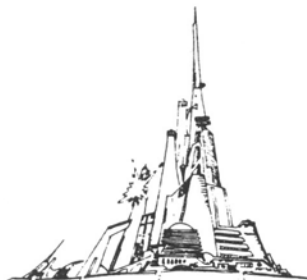
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TRS 80 COLOR

ENVELOPE (From Page 38)

from the left-hand margin.

Once that information is entered, he has his printer move to the top of the next page, prints a "letterhead," spaces down several spaces and starts the letter off with the date and "Dear _ _ _:" salutation.

Owing to the number of word processors on the market, we won't try to tell you how to format yours, but here's how the program could be written in BASIC. With every word processor we've seen for the CoCo, the actual formatting should be easy to accomplish.

```
10 FOR X=1 TO 26:PRINT #2: NEXT
20 PRINT #2,"Lane P. Lester,
Ph.D."
30 PRINT #2,"Liberty Baptist
College"
40 PRINT #2,"Lynchburg, VA 24506"
50 FOR X=1 TO 4:PRINT #2:NEXT
60 LINEINPUT "NAME";A$
70 LINEINPUT "STREET ADDRESS";B$
80 LINEINPUT "CITY, STATE, ZIP";C$
90 PRINT #2,TAB(35)A$:PRINT
#2,TAB(35)B$:PRINT #2,TAB(35)C$
100 FOR X=1 TO 33:PRINT #2:NEXT X
```

Once you've done this, simply use whatever you wish to make a "letterhead" and write the letter. Then, once done, make a triple fold in the paper and you have a letter on one side and (on the top sheet which becomes the "back") an envelope, all addressed and ready to mail. Just tape the paper together.

It's a neat trick that can save you hours of time.

Utility...

FOR THE GAMERS... SCREEN-SCORING

By Charles H. Santee

I have enjoyed the RAINBOW very much and, especially, the SNAIL INVADERS game by Fred Scerbo and Dale Haggerty of IMB. It is especially interesting.

Being very interested in on-screen scoring on the graphics pages, I have written up a routine which, I believe, will conserve a great deal of memory. It is one I have been using in games.

To insert this routine into a game, use lines 1000 to 2130 without the documentation included in the listing so you can follow the routine's logic. Or, you can run the program as is to see how it works.

A few notes...

1. If you would like a set number of digits on the screen for the score

(e.g., 0057), edit line 2030 as:
LS=LEN(SS\$):SS\$=RIGHT\$(SS\$,LS-1)
:SS\$=STRING\$(5-LS,"0")+SS\$

2. If you want a right to left "flip" of numerals delete lines 2105 and 2115 and edit the lines listed below as follows:

```
1015 NEXT X
:E$="C1BRNU4RU4RD4RU4RD4RU4RNL4D2NL4
D2L8C3":RETURN
```

```
2085 GG$=GG$+E$+G$(V)
```

3. When the above method is used and a score is very large, GG\$ may give an LS error.

The listing:

```
5 '%%%% CLEAR ENOUGH SPACE FOR
THE GRAPHICS AND STRINGS %%%
10 CLEAR 6000
15 GOSUB 1000:'%%%% GO TO THE
SUBROUTINE WHICH MAKES A
FILE OF GRAPHIC NUMBERS %%%
20 '%%%% THIS ROUTINE SELECTS
SOME NUMBERS TO BE DRAWN
IN A GAME, THE NUMBERS
DRAWN WOULD BE THE SCORE %%%
25 CLS:INPUT"FIRST NUMBER";F
30 INPUT"LAST NUMBER";L
35 INPUT"INPUT STEP";ST
40 '%% SET UP GRAPHIC SCREEN %
45 PMODE 3,1:PCLS:SCREEN 1,0
50 '%% the numeric variables SC
is the score %%%
55 FOR SC = F TO L STEP ST
60 GOSUB 2000
65 FOR P = 1 TO 200:NEXT P:'%%
PAUSE SO THAT THE SCORE CAN
BE VIEWED
70 NEXT SC
80 GOTO 25:'% TRY NEW NUMBERS %
1000 '$'$'$'$ This subroutine
sets up a table of graphic
strings to be used in the
draw statement which can be
used to draw the numbers
0 through 9 '$'$'$'$
1005 FOR G = 0 TO 9
1010 READ G$(G)
1015 NEXT G:RETURN
1020 '### THE NUMERAL 0 ###
1025 DATA"BR2U4R3D4NL3BR3"
1030 '### 1 ###
1035 DATA"BR4NU4BR4"
1040 '### 2 ###
1045 DATA"BR2U2R3U2NL3BD4NL3BR3"
1050 '### 3 ###
1055 DATA"BR2R3U2NL2U2NL3BD4BR3"
1060 '### 4 ###
1065 DATA"BR2BU2NU2R3U2D4BR3"
1070 '### 5 ###
1075 DATA"BR2R3U2L3U2R3BD4BR3"
1080 '### 6 ###
1085 DATA"BR2U4NR3D2R3D2NL3BR3"
1090 '### 7 ###
```

```

1095 DATA"BR2BU3UR3D4BR3"
1100 '### 8 ###
1105 DATA"BR2U4R3D2NL3D2NL3BR3"
1110 '### 9 ###
1115 DATA"BR2BU2NR3U2R3D4BR3"
2000 '"$"$"$ This subroutine
      converts the numeric
      variable into a graphic
      variable and draws the
      numbers on the screen
2005 '%% INITIALIZE THE GRAPHIC
      VARIABLE %%
2010 GG$=""
2015 '%% CONVERT THE NUMERIC
      VARIABLE TO A STRING %%
2020 SS$=STR$(SC)
2025 '%% DELETE THE LEADING
      BLANK FROM THE STRING %%
2030 LS=LEN(SS$):SS$=RIGHT$(SS$,
      LS-1)
2035 '%% The next step is to
      pick off each decimal of
      numerical string, convert
      that string back to a
      numeral, and use that
      numeral to call up the
      graphic string.
2040 '%% The graphics are
      combined to form one

```

```

      graphic for drawing the
      score.
2045 L=LEN(SS$):'### DEFINE
      THE NUMBER OF NUMERALS
      IN THE STRING
2050 '### REPEAT THE STEPS BELOW
      FOR EACH NUMERAL
2055 FOR A=1 TO L
2060 '%% DEFINE EACH NUMERAL IN
      THE STRING
2065 N$=MID$(SS$,A,1)
2070 '%% DETERMINE THE VALUE
      OF THE NUMERAL %%
2075 V=VAL(N$)
2080 '%% USE THAT VALUE TO
      CALL UP THE GRAPHIC
      REPRESENTATION OF THE
      VALUE AND ADD THE GRAPHIC
      STRINGS TOGETHER %%
2085 GG$=GG$+G$(V)
2090 '%% DO IT AGAIN FOR
      THE REST OF THE NUMERALS %%
2095 NEXT A
2100 '%% ERASE THE LAST GRAPHIC
      BY REDRAWING THE OLD SCORE
      WITH THE BACKGROUND COLOR
2105 DRAW"BM0,20C1S8"+OG$
2110 '%% REDEFINE THE NUMBER TO
      BE ERASED NEXT TIME (OLD
      GRAPHIC)
2115 OG$=GG$
2120 '%% DRAW THE NEW GRAPHIC
      (PRESENT SCORE)
2125 DRAW"BM0,20C3S8"+GG$
2130 RETURN

```

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Utility...

AN 8-BIT DRIVER FOR BASIC USE

By Mark Reeves

Yes, you can get a free eight-bit printer driver from Radio Shack that will allow you to print the bit image graphics and so on (as well as access some of the special characters on the LP VIII). One of the problems with it, though, is that it is in machine language and, sometimes, can be a little difficult to use. But what do you want, its free!

At SNAKE MOUNTAIN SOFTWARE we wanted to have a little more versatility in an eight-bit driver, especially a program that would allow us to move it anywhere in memory. That is important, because it lets us put the driver in some vacant place in the RAM -- out of the way of any program.

Still, it is important that a driver be in machine language, because of the speed. The program below is in BASIC, but POKES machine

(Continued Next Page)

8-BIT (From Page 41)

code into memory. And, because the machine code is position-independent, it can be used easily, simply and anywhere in memory.

There is nothing special about this program. The only thing you might have to adjust is the location where you wish the driver to load. This is accomplished simply by changing the value of the variable LD in line 200 to whatever decimal number you wish.

If you have an assembler, it's easy to translate the hexadecimal codes in the data statements into assembly language Op Codes, assemble this and make a tape. It works just as well in BASIC, but you might want to get some practice working with the assembler.

The listing:

```
200 LD=492: 'OR ANY ADDRESS YOU WISH
210 FOR I=0 TO 40
220 READ VL$
230 PK=VAL("&H"+VL$)
240 POKE LD+I,PK
250 NEXT I
260 EXEC LD
270 END
280 DATA 83,00,00,30,8D,00,08
290 DATA 8F,01,68,96,96,97,E6
300 DATA 39,34,04,D6,6F,5C,2B
310 DATA 02,35,84,35,04,32,62
320 DATA 34,04,F6,FF,22,54,25
330 DATA FA,BD,8E,0C,35,84
```

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A new service, **RAINBOW ON TAPE**, is now available. The service will provide listings of programs appearing in the **RAINBOW** on cassette tape, ready to CLOAD into your CoCo.

All programs longer than 25 lines will be offered through **RAINBOW ON TAPE**. The tape is designed to facilitate the loading of programs and will go hand-in-hand with editorial copy in the particular issue of the **RAINBOW** in which the programs appear. No documentation will accompany the tapes.

RAINBOW ON TAPE is available from the **RAINBOW**, 5803 Timber Ridge Dr., Prospect, KY, 40059, for \$5 each or \$50 per year (12 tapes). Kentucky residents please add 5% state sales tax. No "back issue" tapes are available, although plans will be announced shortly to make selected groups of programs from back issues available. All tapes are guaranteed to load.

"Obviously, one of the major time-consuming tasks for people who want to type in programs from the **RAINBOW** is the typing-in process," said Lawrence C. Falk, publisher of the magazine. "The new **RAINBOW ON TAPE** service will eliminate this problem -- and the need to spend additional hours debugging typographic errors."

RAINBOW ON TAPE will be sent first class mail to avoid Postal Service delays.

Utility...

**SAVE ML PROGRAMS
TO YOUR DISK**

By Jorge Mir
RAINBOW Utilityman

SAVEM is a disk version of a program previously published in the **RAINBOW** that facilitates the saving of machine language programs. Additional features have been incorporated into this new version of the program which I find useful with the disk system.

The program starts by relocating itself to the upper part of RAM. It checks to determine whether you have a 16K or 32K system and relocates itself starting at hex location &H3600 for 16K or &H7600 for 32K. Since most machine language programs occupy the lower RAM area, relocating **SAVEM** to a higher location will avoid conflict most of the time. In

(Continued on Page 44)



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DISK SAVE (From Page 42)

the event that the program you wish to save covers the RAM areas noted above, you can have *SAVEM* relocate itself to any RAM area by changing lines 720-800, thus avoiding conflict with the program to be copied.

After relocating itself, *SAVEM* presents you with a menu through which you can choose to copy a program from cassette or disk. It also provides for copying a program currently in RAM (if you choose this option and have no program in RAM, *SAVEM* will crash).

To load from cassette, you are asked for the program name and, after you input it, the cassette tape is searched for the program. If you want to offset load the program, you indicate so as part of the program name just as you would do if you were offset loading a program from cassette without the aid of the *SAVEM* program (see the manual for the syntax).

Once the program is loaded into RAM, the hex and decimal values of the start, end and execute addresses are displayed for information purposes. In addition, you are asked whether the target program was offset loaded and, if so, *SAVEM* then asks for the offset hex value so it can correct the reference at the start of the program. In addition, you are asked for the title you wish to use for the program you are saving and you are given a choice of saving the program to tape or disk.

Before you indicate you want the program saved to tape, you should have the recorder ready in the record mode.

If the program is saved to disk, *SAVEM* creates a data file indicating the start, end and execute points of the target program. This comes in handy later on when you want to load from disk and copy the programs to other disks or cassette tapes since, as you may have already found out, the disk system does not use locations &H007E-&H007F or &H01E7-&H01E8 to indicate the start and end of programs.

To load from disk, you can load any machine language program with the *SAVEM* program, provided the program was previously copied from cassette using *SAVEM*. Before loading from disk, the *SAVEM* searches for the start, end and execute addresses previously stored on disk when the target program was loaded from cassette and then transferred to disk. If the program was not previously saved using

SAVEM, it returns to the program name prompt.

Once the program is loaded into RAM you are given a choice of saving to disk or cassette and an option to change the title of the program.

In loading from memory, when your program is already stored in RAM, you can still copy to cassette or disk since *SAVEM* determines to various addresses needed as well as the name (which is stored in locations &H01D2-&H01D9). This choice was added since, in some instances, you may not know the exact name of the program stored on cassette. If that is the case, you simply type CLOADM and the program is loaded into RAM. You then can run *SAVEM* to copy to disk or tape.

There are no special operating instructions to run *SAVEM*. However, it must be loaded and RUN before attempting to copy any programs. If you load *SAVEM* after you have a machine language program in RAM, it may not function properly.

SAVEM is to be used only to copy your own programs from tape to disk and vice-versa.

The listing:

```

10 GOTO 730
20 CLS:PRINT TAB(10)"* SAVEM *"
30 PRINT TAB(10)"-----"
40 PRINT @165,"1 - LOAD FROM DIS
K"
50 PRINT @197,"2 - LOAD FROM CAS
SETTE"
60 PRINT @229,"3 - COPY PROGRAM
IN RAM"
70 PRINT @261,"4 - END PROGRAM"
80 I$=INKEY$:IF I$=""THEN80
90 I=VAL(I$):IF I<1 OR I>4 THEN
80
100 IF I=3 OR I=4 THEN 130
110 PRINT:INPUT"PROGRAM NAME":N$
120 IF LEN(N$)>8 THEN 110
130 ON I GOTO 150,310,320
140 END
150 IF LEN(N$)=8 THEN 170
160 N$=N$+" ":GOTO150
170 LOADM N$
180 CLOSE#1:R=0
190 OPEN"D",#1,"SAVEM/DAT",20
200 FIELD #1, 8 AS NAME$, 4 AS B
EGIN$, 4 AS TAIL$, 4 AS START$
210 IF R=LOF(1) THEN 110 ELSE R=R
1
220 GET #1, R
230 IF NAME$=N$ THEN 240 ELSE210
240 A$=PROG$
250 A=VAL("&H"+BEGIN$)
260 B=VAL("&H"+TAIL$)
```

(Continued on Page 4

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DISK SAVE (From Page 44)

```

270 C=VAL("&H"+START$)
280 CLOSE #1
290 CLS:PRINT"PROGRAM: "N$
300 GOTO 420
310 CLOADM N$
320 PG$=""
330 FOR X=474 TO 481
340 Y=PEEK(X):IF Y=32 THEN Y=143
350 PG$=PG$+CHR$(Y)
360 NEXT X
370 A=PEEK(487)*256+PEEK(488)
380 B=PEEK(126)*256+PEEK(127)-1
390 C=PEEK(157)*256+PEEK(158)
400 Y$=""
410 CLS:PRINT"PROGRAM: "PG$
420 PRINT"          DECIMAL"," HEX
"
430 PRINT"          -----"," ---
--"
440 PRINT"START: "A," "HEX$(A)
450 PRINT" END: "B," "HEX$(B)
460 PRINT"ENTRY: "C," "HEX$(C)
470 IF LEFT$(I$,1)="Y" THEN 510
480 IF I<>3 THEN 510
490 PRINT:INPUT"WAS PROGRAM OFFS
ET LOADED";Y$
500 IF LEFT$(Y$,1)="Y" THEN INPU
T"OFFSET ADDRESS (TYPE '&H'+####
)";I:A=A+I:GOTO410
510 PRINT:INPUT"WHAT IS THE TITL
E YOU WISH TO USE FOR THIS PRO
GRAM";A$
520 A$=LEFT$(A$,8)
530 PRINT"PROGRAM CAN BE SAVED O
N:"
540 PRINT"      (D) DISK"
550 PRINT"      (C) CASSETTE"
560 PRINT:INPUT"YOUR CHOICE";I$
570 IF I$="D" THEN 600
580 IF I$="C" THEN 700
590 GOTO 560
600 SAVEM A$,A,B,C
610 OPEN"D",#1,"SAVEM/DAT",20
620 FIELD #1, 8 AS NAME$, 4 AS B
EGIN$,4 AS TAIL$, $ AS START$
630 R = LOF(1)+1
640 LSET NAME$=A$
650 LSET BEGIN$=HEX$(A)
660 LSET TAIL$=HEX$(B)
670 LSET START$=HEX$(C)
680 PUT #1,R
690 CLOSE#1:GOTO 710
700 CSAVEM A$,A,B,C
710 PRINT:PRINT"ALL DONE":GOTO 2
0
720 DATA BD,B3,ED,1F,02,7E,96,A7
730 IF PEEK(&H25)<>&H7F THEN 780
740 CLEAR200:FOR I=0TO7:READE$
750 POKE&H7603+I,VAL("&H"+E$):NE
XT
760 DEFUSR0=&H7603:X=USR0(&H7618
)

```

MAKE LETTERHEADS
FOR CORRESPONDENCE

Let's face facts folks, while a lot of printers can use single sheet paper, its a hassle. Yet, with all the sophisticated word processors out, your CoCo is an excellent tool for writing letters -- and it and the word processing software is a heck of a lot less expensive than a good electric typewriter.

But those single sheets!

One answer is simply to print out your name and address on the inside of your letterhead, using white pin feed paper. That eliminates the problem of feeding in single sheets -- and, another annoyance -- it satisfies the little "paper out" selector which some printers have and which is activated when single sheets pass the little metal reed.

The EAST TEXAS COLOR COMPUTER CLUB, and president Ron Garrett, have come up with a unique solution that you might consider. Let your CoCo and printer print a letterhead. Because the CoCo and line printer graphics are so versatile (especially with the LP VII and LP VIII), you can get just about as fancy as you wish!

Ron and the EAST TEXAS COLOR COMPUTER CLUB have generously consented to allow us to print the following program, which is what the club uses to produce its letterhead (see the illustration). With a little imagination, you can adapt this program to your own use. Please do not use their graphics. They are copyrighted and listed here for illustrative purposes only.

The Club (2101 East Main St., Henderson, TX, 75652) is always looking to attract members and publishes a bi-monthly newsletter. Those interested should contact Garrett.

The listing:

```

1 CLS:PRINT@232,"SET PRINTER TO
8          BIT POSITION"
2 PRINT@380," ":INPUT" HIT <EN
TER> WHEN READY";Z$
3 'COPYRIGHT AUG/1981 BY THE EAS
T TEXAS COLOR COMPUTER CLUB
4 '2101 EAST MAIN STREET
5 'HENDERSON, TEXAS 75652
10 DEFUSR0=15785
770 GOTO 20
780 CLEAR200:FORI=0TO7:READE$
790 POKE&H3603+I,VAL("&H"+E$):NE
XT
800 DEFUSR0=&H3603:X=USR0(&H3618
)
810 GOTO 20

```



```

20 PMODE 4,1:PCLS:SCREEN 1,1
30 LINE(88,10)-(168,10),PSET
40 LINE-(171,23),PSET
50 LINE(167,10)-(170,23),PSET
60 LINE(88,10)-(85,23),PSET
70 LINE(89,10)-(86,23),PSET
80 LINE(86,23)-(170,23),PSET
90 LINE(86,24)-(170,24),PSET
100 LINE(171,23)-(171,77),PSET
110 LINE(85,23)-(85,77),PSET
120 LINE(86,23)-(86,77),PSET
130 LINE(170,23)-(170,77),PSET
140 LINE(150,23)-(150,77),PSET
150 LINE(85,77)-(171,77),PSET
160 LINE(85,78)-(171,78),PSET
170 LINE(91,25)-(148,25),PSET
180 LINE-(148,75),PSET
190 LINE-(91,75),PSET
200 LINE-(91,25),PSET
210 LINE-(96,30),PSET
220 LINE-(108,29),PSET
230 LINE-(121,28),PSET
240 LINE-(133,29),PSET
250 LINE-(146,30),PSET
260 LINE-(150,24),PSET
270 LINE(146,30)-(147,40),PSET
280 LINE-(148,49),PSET
290 LINE-(147,59),PSET
300 LINE-(146,68),PSET
310 LINE-(150,74),PSET
320 LINE(146,68)-(133,69),PSET
330 LINE-(121,70),PSET
340 LINE-(108,69),PSET
350 LINE-(96,68),PSET
360 LINE-(91,73),PSET
370 LINE(96,68)-(95,49),PSET
380 LINE-(96,30),PSET
390 FOR X=60 TO 77 STEP 2
400 LINE(150,X)-(170,X),PSET:NEXT
410 LINE(153,26)-(167,57),PSET,B
420 CIRCLE(162,30),3
430 LINE(155,34)-(165,36),PSET,B
440 LINE(155,38)-(165,40),PSET,B
450 FOR X=157 TO 163 STEP 4
460 LINE(X,42)-(X+2,42),PSET,BF
470 LINE(X,46)-(X+2,48),PSET,BF
480 LINE(X,50)-(X+2,52),PSET,BF
490 LINE(X,54)-(X+2,56),PSET,BF
500 NEXT
510 CIRCLE(115,40),8
520 CIRCLE(135,39),8
530 CIRCLE(115,42),4
540 CIRCLE(135,41),4
550 CIRCLE(126,50),7,.1,.15,.5
560 CIRCLE(106,38),20,.1,0,.1
570 CIRCLE(115,48),30,.5,.1,.28
580 CIRCLE(171,33),10,5,1,.75,.2
590 CIRCLE(84,33),10,5,1,.25,.75
600 CIRCLE(171,70),5,5,1,.75,.25
610 CIRCLE(84,70),5,5,1,.25,.75

```

```

620 LINE(181,33)-(200,55),PSET
630 LINE-(176,70),PSET
640 LINE(172,43)-(187,55),PSET
650 LINE-(172,65),PSET
660 LINE(74,33)-(55,55),PSET
670 LINE-(79,70),PSET
680 LINE(84,43)-(65,55),PSET
690 LINE-(84,65),PSET
700 CIRCLE(79,75),2
710 CIRCLE(175,75),2
720 REM DRAW COMPUTER
730 LINE(83,80)-(168,80),PSET
740 LINE-(168,84),PSET
750 LINE-(170,85),PSET
760 LINE-(170,95),PSET
770 LINE-(150,138),PSET
780 LINE-(57,138),PSET
790 LINE-(70,110),PSET
800 LINE-(70,105),PSET
810 LINE-(83,80),PSET
820 LINE(70,105)-(155,105),PSET
830 LINE(70,107)-(154,107),PSET
840 LINE(70,109)-(153,109),PSET
850 LINE(150,138)-(150,135),PSET
860 LINE-(158,109),PSET
870 LINE-(170,85),PSET
880 LINE(147,135)-(155,109),PSET

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COLOR COMPUTER CLUB

2101 EAST MAIN

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```

890 LINE-(154,107),PSET
900 LINE-(155,105),PSET
910 LINE(162,100)-(173,100),PSET
920 LINE-(173,103),PSET
930 LINE-(162,103),PSET
940 LINE(168,100)-(178,91),PSET
950 LINE-(168,91),PSET
960 LINE(145,95)-(150,98),PSET,B
970 LINE(173,103)-(178,94),PSET
980 LINE-(178,91),PSET
990 LINE(155,105)-(168,80),PSET
1000 LINE(75,115)-(145,115),PSET
1010 LINE-(137,135),PSET
1020 LINE-(65,135),PSET
1030 LINE-(75,115),PSET
1040 FOR X=80 TO 135 STEP 5
1050 LINE(X,117)-(X+2,119),PSET,
BF

```

(Continued Next Page)

LETTERHEADS (From Page 47)

```

1060 NEXT
1070 FOR X=78 TO 133 STEP 5
1080 LINE(X,122)-(X+2,124),PSET,
BF
1090 NEXT
1100 FOR X=75 TO 130 STEP 5
1110 LINE(X,127)-(X+2,129),PSET,
BF
1120 NEXT
1130 FOR X=72 TO 127 STEP 5
1140 LINE(X,132)-(X+2,134),PSET,
BF
1150 NEXT
1160 LINE(78,111)-(108,113),PSET
,B
1170 DRAW"BM82,145;NF2L6G2D8F2R6
E2;BR5NF2U8E2R6F2D8G2NL6;BR7NU12
R10;BR7H2U8E2R6F2D8G2NL6BR7U12R6
F2D3G2L6R3F6
1180 DRAW"BM20,20;NR15D7NR10D8R1
5;BD32H2L11G2D4F2R11F2D3G2L11H2;
BD9R7NR8D15
1190 LINE(27,42)-(20,57),PSET:LI
NE(27,42)-(35,57),PSET:LINE(25,5
0)-(29,50),PSET
1200 DRAW"BM235,20;L8ND15L8;BD22
NR15D8NR10D8NR15;BD7F8NE8NG8F8;B
D32H2L11G2D4F2R11F2D3G2L11H2"
1210 LINE(228,89)-(220,104),PSET
:LINE(228,89)-(235,104),PSET:LIN
E(225,97)-(232,97),PSET
1220 DRAW"BM37,167;H2L6G2D8F2R6E
2;BR5NF2U8E2R6F2D8G2NL6;BR7U12F5
E5D12;BR5U12R6F2D3G2L6;BR15BU7D1
0F2R6E2U10;BR5R5ND12R5;BR5NR10D6
NR7D6R10;BR5U12R6F2D3G2NL6F5;BU1
BR28NE2L6H2U8E2R6F2BU2;BR5D12R10
;BR5BU2NU10F2R6E2U10;BR5ND12R6F2
D2G2NL6F2D2G2L6"
1230 CIRCLE(27,120),8
1240 CIRCLE(27,120),4,5,1,.1,.9
1250 DRAW"BM25,184;E1R1F1G3D1R3;
BR3U5;BR4G1D3F1R1E1U3H1NL1;BR4ND
5;BR6NR3D2NR2D3R3;BR2U4NR3E1R1F1
D4;BR4NH1R1E1U1H1L1H1E1R1F1;BU1B
R3R1ND5R2;BR6ND5F2E2D5;BR3U4NR3E
1R1F1D4;BR3U3BU1U1;BR3ND5F5U5
1260 DRAW"BM125,184;D2ND3R3ND3U2
;BR3NR3D2NR2D3R3;BR3U5F5U5;BR3D5
R1E1U3H1L1;BR6NR3D2NR2D3R3;BR3U5
R2F1D1G1NL2F2;BR4NH1R1E1U1H1L1H1
E1R1F1;BR3NE1D3F1R1E1U3H1NL1;BR4
ND5F5U5;BR8R3G3D2;BR7NH1R1E1U1H1
L2U2R3;BR5NF1L1G1D1R1E1H1NL2;B
R5BU3NR3D2R2F1D1G1L1H1;
1270 DRAW"BR7D1NR3U1E3H1L1G1
1280 FOR X=15742 TO 16360
1290 READ A:POKE X,A:NEXT
1300 DATA 0,0,142,61,152,191,1,1
07,134,126,183,1,106,183,1,103,1
42,63,80,191,1,104,127,63,175,57
,13,111,39,3,126,140,241,50,98,1

```

```

89,161,177,129,95,39,1,57,52,52
1310 DATA 150,182,129,0,39,14,12
9,2,39,19,129,4,39,35,53,52,18,1
34,32,57,134,16,183,63,181,134,3
2,32,7,134,16,183,63,181,134,96,
183,63,176,134,28,183,63,183,183
1320 DATA 63,179,32,18,134,32,18
3,63,181,134,192,183,63,176,134,
28,183,63,183,127,63,179,158,186
,191,63,177,191,63,190,127,63,18
7,134,18,189,63,106,134,27,189,6
3,106
1330 DATA 134,16,189,63,106,134,
0,189,63,106,134,112,189,63,106,
246,63,181,84,84,52,4,16,142,63,
201,52,32,189,62,219,53,32,142,6
3,193,166,128,68,125,63,175,39,1
1340 DATA 67,138,128,167,160,140
,63,201,38,238,16,140,63,233,45,
222,142,63,201,127,63,186,166,12
8,183,63,180,124,63,186,140,63,2
33,38,5,189,62,114,32,53,166,132
,177
1350 DATA 63,180,38,15,124,63,18
6,166,128,140,63,233,38,239,189,
62,114,32,31,189,62,114,32,208,1
82,63,186,74,39,85,134,28,189,63
,106,141,69,182,63,186,189,63,10
6,182,63,180,189,63,106,57,53,4,
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1360 DATA 63,106,115,63,187,246,
63,176,190,63,190,58,193,32,38,1
1,246,63,187,193,0,38,4,246,63,1
81,58,191,63,190,122,63,183,39,3
,126,61,254,134,30,189,63,106,53
,52,134,32,57,125,63,179,39,3,12
0,63,186,57,141,245
1370 DATA 182,63,180,189,63,106,
122,63,186,38,245,57,134,7,183,6
3,185,190,63,190,191,63,188,190,
63,188,230,132,156,183,45,2,198,
0,247,63,192,79,142,63,193,120,6
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,193,7,39,11,32,7,246,63
1380 DATA 185,193,4,39,2,103,134
,76,129,8,45,216,182,63,181,16,1
90,63,188,49,166,16,191,63,188,1
22,63,185,246,63,176,193,32,38,9
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5,63,185,38,161,16,190,63,190,49
,33,16,191,63,190,57,52,4,214,11
1
1390 DATA 193,254,53,4,39,14,16,
190,128,0,16,140,69,88,38,3,126,
130,115,57,50,98,52,23,26,80,141
,48,95,141,47,198,8,52,4,95,68,8
9,88,141,37,53,4,90,38,243,141,2
8,53,3,129,13,39,8,12,156,214,15
6,209,155,37
1400 DATA 6,15,156,141,20,141,18

```

(Continued on Page 51)

TELEWRITER

Provides your COLOR COMPUTER with:

REAL LOWER CASE CHARACTERS ■ A POWERFUL TEXT FORMATTER
51 COLUMN × 24 LINE SCREEN DISPLAY ■ SPECIAL DRIVER FOR EPSON MX-80
ADVANCED CASSETTE HANDLING FEATURES ■ A SOPHISTICATED FULL-SCREEN TEXT EDITOR

and requires absolutely no hardware modifications

TELEWRITER

Telewriter is a powerful word processor designed specifically for the Color Computer. It can handle almost any serious writing job and it is extremely easy to use. It has all the advanced features you need to create, edit, store, format and print any kind of text. With Telewriter you can quickly produce perfect, finished copy for letters, reports, term papers, articles, technical documentation, stories, novels, screenplays, newsletters. It is also a flexible and efficient way to take notes or organize ideas and plans.

51 × 24 DISPLAY

The Color Computer is an incredibly powerful and versatile computer, but for text editing it has some major drawbacks. The small 32 character by 16 line screen format shows you too little of the text and, combined with its lack of lower case letters, bears little resemblance to the way text really looks on the page. Reverse video in place of lower case just adds confusion.

Telewriter eliminates these shortcomings with **no hardware modifications required**. By using software alone, Telewriter creates a new character set that has **real lower case letters**, and puts 24 lines of 51 characters on the screen. That's more on-screen characters than Apple II, Atari or TRS-80 Model III. That's more than double the Color Computer's standard display.

FULL SCREEN EDITOR

The Telewriter editor is designed for maximum ease of use. The commands are single key (or single key plus control key), fast, and easy to remember. There is no need to switch between insert modes and delete modes and cursor movement modes.

You simply type. What you type is inserted into the text at the cursor, on the screen. What you see on the screen is always the current state of your text. You can move quickly through the text with one key cursor movement in all 4 directions, or press the shift key simultaneously for fast, auto-repeat. You can jump to the top or bottom of the text, the beginning or end of a line, move forward or backward a page at a time, or scroll quickly up or down. When you type past the end of a line, the wordwrap feature moves you cleanly to the next.

You can copy, move or delete any size block of text, search repeatedly for any pattern of characters, then instantly delete it or replace it with another. Telewriter gives you a tab key, tells you how much space you have left in memory, and warns you when the buffer is full.

FORMAT FEATURES

When it comes time to print out the finished manuscript, Telewriter lets you specify: left, right, top, and bottom margins; line spacing and lines per page. These parameters can be set before printing or they can be dynamically modified during printing with simple format codes in the text.

Telewriter will automatically number pages (if you want) and automatically center lines. It can chain print any number of text files from cassette without user intervention. You can tell it to start a new page anywhere in the text, pause at the bottom of the page, and set the Baud rate to any value (so you can run your printer at top speed).

You can print all or any part of the text buffer, abort the printing at any point, and there is a "Typewriter" feature which allows you to type straight to your printer. Because

Telewriter lets you output numeric control codes directly (either from the menu or during printing), it works with any printer. There's even a special driver for the Epson MX-80 that lets you simply select any of its 12 fonts and do underlining with a single underline character.

CASSETTE HANDLER

Telewriter makes cassette as simple to use as possible. It will search in the forward direction till it finds the first valid file, so there's no need to keep retying a load command when you are lost in your tape. You can save all or any part of the text buffer, and you can append pre-existing files to what you have in the buffer already. You can abort an append or filesearch without harming the program or the text in the buffer.

Telewriter will maintain compatibility with popular Color Computer disk systems, but, since it makes using cassette almost painless, you can still have a powerful word processor without the major additional cost of a disk.

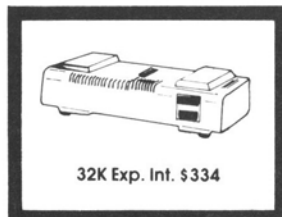
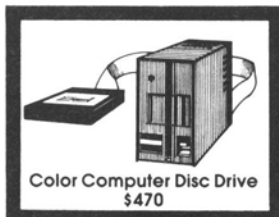
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Telewriter turns your Color Computer into the lowest cost hi-power word processor in the world today. It runs in 16K or 32K (32K recommended) and is so simple you can be writing with it almost immediately. It comes with complete documentation and is fully supported by Cognitec. Telewriter costs \$49.95 (California residents add 6% tax). To order or request more information write:

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LETTERHEADS (From Page 48)

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 128,32,255,0,255,0,32,0,30,159,3
 0,128,0,0,0,0,0,0,0,0,128,128,
 128,128,128,128
 1410 DATA 128,128,128,128,12
 8,128,128,128,128,128,128,12
 8,128,128,128,128,128,128,12
 8,128,128,128,128,0,0,0,0,0,0,
 0
 1420 Y=USR(0)
 1430 CLS:PRINT @ 232,"I AM FINIS

HED"

1440 INPUT"

WRITE A LETTER"

;L\$

1450 IF LEFT\$(L\$,1)="Y" THEN CLS
 :PRINT#-2,CHR\$(13):GOTO1460 ELSE
 END

1460 LINE INPUTA\$:IF A\$="-" THEN
 PRINT#-2,CHR\$(31):GOTO 1460

1470 IF A\$="[" THEN PRINT#-2,CHR
 \$(30):GOTO 1460

1480 IF A\$="]" THEN PRINT#-2,STR
 ING\$(50,32);:GOTO 1460

1490 PRINT#-2,A\$:GOTO 1460

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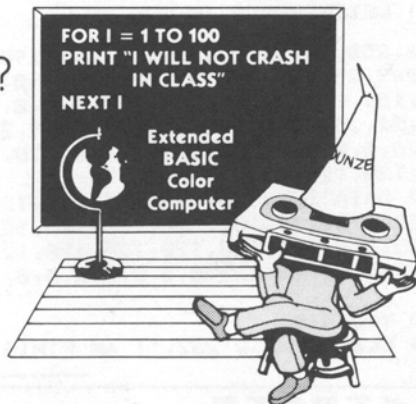
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